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IN

ARITHMET

SECOND BOOK.

BY

M. FRENCH SWARTHOU

AND

M. A. FARNHAM.

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NEW YORK AND CHICAGO.

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PREFACE.

WE are convinced that a prepared graded system of examples, is a great advantage to pupils as well as a source of economy. There is a demand for examples for home study; and the time heretofore occupied in copying from the board is saved, as well as the expense incurred in the purchase of paper, which is a large item for a year.

We commence at the foundation, introducing new subjects and new points as rapidly as the pupil's mind is prepared for them. Many explanations and illustrations upon the board, from the teacher, are necessary, as our aim is only to present practical work.

As the work advances, a review of some previous work is kept up, to impress thoroughly upon the mind the principles involved.

A new subject heads a lesson, consisting of two or three examples; the remaining part of the lesson being a review.

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SHELDON'S

GRADED EXAMPLES IN ARITHMETIC.

SECOND BOOK.

FIFTH GRADE, OR FIFTH YEAR'S WORK.

LESSON I.

1. Find the prime factors of 180180. Of 14322.
2. Find the prime factors of 42966. Of 14820.
3. What are the prime factors of 4186? Of 6380?
4. $7865432 \times 6849 = ?$
5. $72648767634 \div 767879 = ?$

LESSON II.

1. Prime factors of 42966 = ? Of 22230 = ?
2. $\frac{32 \times 49 \times 56}{8 \times 16 \times 28} = ?$ $\frac{35 \times 48 \times 72}{8 \times 15 \times 18} = ?$
3. $\frac{54 \times 64 \times 45 \times 56}{18 \times 30 \times 24 \times 28} = ?$ $\frac{84 \times 96 \times 108 \times 119}{42 \times 72 \times 168 \times 96} = ?$
4. Dividend 478656762832, quotient 56789; what is the divisor?
5. Multiplicand is 7001009, multiplier is 7007867; what is the product?

LESSON III.

1. Prime factors of 34398 = ? Of 15600 = ?
2. Prime factors of 2431 = ? Of 2000 = ?
3. $\frac{11 \times 33 \times 55 \times 77 \times 99 \times 121}{22 \times 44 \times 66 \times 88 \times 110} = ?$

   $\frac{25 \times 7 \times 14 \times 36 \times 9 \times 42}{42 \times 72 \times 21 \times 54 \times 10} = ?$
4. Find the greatest common divisor of 10, 15, 25, 30.
   Find the greatest common divisor of 24, 18, 72.
5. Find the greatest common divisor of 4, 12, 16, 28.
   Find the greatest common divisor of 14, 28, 35.

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LESSON IV.

1. me factors of 51597=? Of 23400=?
2. Find the prime factors of 156240. Of 2456.
3. Find the greatest common divisor of 6, 9, 18, 24. Of 8, 14, 28, 98.
   Find the greatest common divisor of 30, 75, 90, 10.
4. $\frac{66\times9\times12\times10}{9\times11\times6\times8}$=? $\frac{26\times72\times81\times24}{36\times13\times48\times54}$=?
5. $\frac{16\times5\times3\times32\times22}{10\times8\times12\times4\times7}$=? $\frac{17\times12\times4}{6\times2\times2\times17}$=?

LESSON V.

1. Find the prime factors of 185000. Of 39930.
2. What is the greatest common divisor of 72, 84, 96, 12? Of 52, 91, 156?
3. What is the greatest common divisor of 4438 and 9002?
   What is the greatest common divisor of 8042 and 17881?
4. $\frac{81\times45\times63\times72\times88\times84}{48\times60\times55\times72\times42\times27}$=? $\frac{32\times5\times10\times18}{8\times6\times4\times12}$=?
5. Find the greatest common divisor of 1952 and 1088. Of 2400 and 948.

LESSON VI.

1. Find the prime factors of 936. Of 1158.
2. Find the greatest common divisor of 69, 161, 207, 322, 23.
   Find the greatest common divisor of 56, 98, 182, 364.
3. Find the greatest common divisor of 7, 119, 121.
   Find the greatest common divisor of 425 and 2000.
4. $\frac{6\times15\times16\times22\times12\times4\times27}{4\times10\times9\times36\times7\times81}$=?
5. $\frac{32\times45\times54\times56}{15\times18\times24\times28}$=? $\frac{12\times20\times60\times27\times35}{14\times15\times42\times108}$=?

LESSON VII.

1. Find the least common multiple of 32, 60, 140, 210.
   Find the least common multiple of 16, 48, 80, 32, 66.
2. Find the least common multiple of 21, 30, 44, 26.
   Find the least common multiple of 72, 96, 120, 384.
3. Prime factors of 12496=? Of 17199=?
4. $\frac{8\times24\times48\times72\times96\times120}{16\times32\times72\times90}$=? $\frac{24\times28\times32\times49\times81}{8\times4\times7\times9\times6}$=?
5. Prime factors of 3281=? Of 10778=?

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LESSON VIII.

1. Find the L. C. M. of 5, 16, 24, 32, 48.
   Find the G. C. D. of 3432 and 4760.
2. Find the L. C. M. of 4, 8, 12, 24, 48, 84.
   Find the G. C. D. of 3298 and 10761.
3. Find the L. C. M. of 9, 8, 12, 18, 24, 36, 72.
   Find the G. C. D. of 770 and 970.
4. $\frac{17 \times 51 \times 75 \times 119 \times 153 \times 187}{34 \times 63 \times 102 \times 136 \times 170} = ?$
5. $\frac{13 \times 39 \times 65 \times 91 \times 117 \times 143}{26 \times 52 \times 78 \times 104 \times 130} = ?$

LESSON IX.

1. Reduce to their lowest terms $\frac{119}{161}$. $\frac{189}{783}$.
2. Reduce $\frac{53130}{61215}$ to its lowest terms.
3. Find the G. C. D. of 4277, 9737, and 1414.
   Find the L. C. M. of 9, 15, 33, 99, and 125.
4. Find the G. C. D. of 396, 5184, and 6914.
   Find the L. C. M. of 21, 30, 44, and 126.
5. What is the product of $\frac{18}{12}$ of $\frac{14}{15}$ of $\frac{30}{12}$ of $\frac{35}{40}$ of $\frac{192}{75}$ of $\frac{188}{190}$?

NOTE.—Reduce all fractions in answers to their lowest terms.

LESSON X.

1. Reduce to lowest terms $\frac{1617}{2877}$ and $\frac{1042}{8302}$.
2. Reduce to lowest terms $\frac{275}{440}$.
   P. F. of 255255?
3. Find the G. C. D. of 3500, 1750, 2100, 3150.
   Find the G. C. D. of 99, 88, 77, 66, 55.
4. Find the difference between the G. C. D. and the L. C. M. of 72, 1728, 144.
5. What is the product of $\frac{8 \times 24 \times 48 \times 72 \times 96 \times 120}{16 \times 32 \times 56 \times 80 \times 108}$?

LESSON XI.

1. What are the prime factors of 17199? Of 8208?
2. Reduce to lowest terms the fractions $\frac{348}{6118}$ and $\frac{1728}{11115}$.
3. Change to mixed numbers $\frac{178}{17}$ and $\frac{643}{25}$.
4. What is the L. C. M. of 6, 9, 4, 14, 16?
   G. C. D. of 84, 126, 210 = ?
5. $6 \times 15 \times 16 \times 24 \times 12 \times 21 \times 27 \div 2 \times 10 \times 9 \times 8 \times 36 \times 7 \times 81 = ?$

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LESSON XII.

1. Reduce to lowest terms $\frac{81}{567}$ and $\frac{176}{528}$.
2. Reduce to lowest terms $\frac{486}{1134}$. $25 \times 7 \times 14 \times 36 \div 4 \times 10 \times 21 \times 54 = ?$
3. Give quotient of the L. C. M. of 98, 12, 18, 24, 36, 72, divided by the G. C. D. of 216, 408, 740.
4. What is the product of the G. C. D. of 1584, 2772, by the L. C. M. of 12, 7, 4?
5. Change to a whole number $\frac{3888888}{5184}$.

LESSON XIII.

1. Reduce to their lowest terms $\frac{191}{364}$ and $\frac{1881}{3311}$.
2. Find the G. C. D. of 4410 and 5670. Find the L. C. M. of 2, 7, 5, 6 and 8.
3. Find the G. C. D. of 84, 126 and 210. Find the L. C. M. of 84, 126 and 110.
4. Reduce $\frac{3432}{4160}$ to lowest terms. Prime factors of 19965 = ?
5. Change $15831\frac{114}{323}$ to an improper fraction. Prove.

LESSON XIV.

1. Reduce to their lowest terms $\frac{96}{144}$ and $\frac{4418}{6670}$.
2. Find the G. C. D. of 3471 and 1869.
   Find the L. C. M. of 60, 120, and 240.
3. Reduce $\frac{1584}{3773}$ to its lowest terms. Prime fact. of 12496 = ?
4. Find the G. C. D. of 25, 35, and 70. Find the L. C. M. of 25, 35, and 70.
5. Change $1658\frac{888}{888}$ to an improper fraction. Prove.

LESSON XV.

1. Change $\frac{190850}{25}$ to a whole number.
   Change $\frac{6717800}{98}$ to a mixed number.
2. Change $1919\frac{44}{87}$ to an improper fraction.
   Change $144927\frac{38}{55}$ to an improper fraction.
3. $\frac{81219218}{91}$ = ? Reduce $\frac{4074}{11814}$ to its lowest terms.
4. *P. F. of 47,850 = ? Find the L. C. M. of 840, 520, and 630.
5. Divide the L. C. M. of 232, 370, and 760 by the G. C. D. of the same numbers.

LESSON XVI.

1. Reduce 67895 to 36ths. Reduce 78956 to 47ths.
2. Reduce $7117\frac{1}{9876}$ to an improper fraction.

* P. F. stands for prime factor.

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3. Reduce to lowest terms $\frac{1000}{5040}$ and $\frac{5443}{5040}$.

4. Find the P. F. of 12243.

$$\frac{9\times8\times7\times5\times8\times64\times12}{72\times8\times\text{[illegible]}\times72\times15}=?$$

5. What is the product of the L. C. M. of 15, 30, 40, by the G. C. D. of 462, 770?

LESSON XVII.

1. Reduce $\frac{185}{456}$ to a fraction whose denominator is 6976.
Reduce $\frac{9}{37}$ to a fraction whose denominator is 1080.

2. Reduce to whole or mixed Nos. $\frac{824151}{3185}\frac{790}{}$, $\frac{2810141}{1167}\frac{8481}{}$.

3. Find the difference between the G. C. D. of 84, 126, 210, and the L. C. M. of 24, 48, 16.

4. What is the value of $99\times16\times45\times84\times81$ divided by $75\times22\times13\times6\times9$?

5. What are the prime factors of 20735?
Reduce to an improper fraction $34402\frac{645}{2789}$.

LESSON XVIII.

1. Reduce $\frac{221}{783}$ to a fraction whose denominator is 9036.
Reduce $\frac{5225}{6097}$ to a fraction whose denominator is 17425.

2. Reduce to whole or mixed numbers, $\frac{70887422}{1117}$ and $\frac{99888891}{77}$.

3. $\frac{360\times450\times640\times720\times840}{280\times480\times540\times600\times720}$?

4. Divide the L. C. M. of 840, 520, 630, by the G. C. D. of 700, 350, 420.

5. Reduce $3186\frac{90}{275}$ to an improper fraction, and prove.

LESSON XIX.

1. Reduce $\frac{3}{4}$, $\frac{4}{5}$, $\frac{5}{6}$, and $\frac{7}{8}$ to their least common denominator.

2. Reduce $\frac{3}{4}$, $\frac{2}{5}$, and $\frac{4}{9}$ to their least common denominator,

3. Reduce $\frac{7}{8}$, $\frac{9}{10}$, and $\frac{3}{4}$ to their least common denominator.

4. Reduce $\frac{7}{8}$ to a fraction whose denominator is 960.
Reduce 675 to a fraction whose denominator is 476.

5. Reduce $\frac{7892}{11116}$ to its lowest terms.
$6\times15\times16\times24\times12\times21\times27\div25\times4\times10\times9\times8\times36\times7\times81\times8=?$

LESSON XX.

1. Reduce $\frac{1}{2}$, $\frac{3}{4}$, $\frac{5}{6}$, and $\frac{5}{12}$ to their least common denominator.

2. Reduce $\frac{3}{4}$, $\frac{2}{5}$, $\frac{4}{9}$, and $\frac{2}{11}$ to their least common denominator.

3. Reduce $\frac{7}{8}$, $\frac{9}{10}$, $\frac{3}{4}$, and $\frac{4}{5}$ to their least common denominator.

4. Reduce $\frac{5}{8}$ to a fraction whose denominator is 336.
Reduce $\frac{5}{12}$ *to a* fraction whose denominator is 324.

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5. Change 426 to 16ths.
Dividend is $63 \times 72 \times 96 \times 36 \times 77 \times 12$. Divisor is $42 \times 66 \times 22 \times 18 \times 12 \times 5$. What is the quotient?

LESSON XXI.

1. Find the sum of $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{5}{6}$.
Of $\frac{7}{8}$, $\frac{3}{6}$, $\frac{2}{3}$, and $\frac{1}{2}$.
2. Find the sum of $\frac{7}{8}$, $\frac{3}{4}$, and $\frac{1}{3}$.
Of $\frac{4}{5}$, $\frac{7}{10}$, and $\frac{13}{15}$.
3. Reduce $\frac{9}{10}$, $\frac{4}{5}$, and $\frac{4}{15}$ to their L. C. D.
Reduce $\frac{4}{5}$, $\frac{7}{10}$, and $\frac{13}{15}$ to their L. C. D.
4. Find the least common multiple of the first five odd numbers.
Reduce $\frac{48}{60}\frac{43}{40}$ to its lowest terms.
5. Reduce 207 to 15ths.
Reduce $\frac{1}{8}\frac{2}{7}\frac{8}{2}\frac{8}{2}$ to a mixed number.

LESSON XXII.

1. Add $\frac{1}{2}$, $\frac{2}{3}$, $\frac{4}{13}$, and $\frac{2}{39}$. Add $\frac{3}{4}$, $\frac{4}{7}$, $\frac{31}{42}$, and $\frac{9}{84}$.
2. What is the sum of $\frac{3}{16}$, $\frac{9}{24}$, $\frac{13}{48}$, and $\frac{11}{96}$.
Add $\frac{7}{9}$, $\frac{11}{36}$, $\frac{17}{108}$, and $\frac{17}{216}$.
3. Reduce $\frac{2}{5}$, $\frac{3}{4}$, and $\frac{5}{6}$ to 12ths.
Reduce 75 to 27ths.
4. What is the product of the L. C. M. and G. C. D. of 12, 16, 24, and 32?
5. $77 \times 100 \times 18 \times 64 \div 25 \times 11 \times 49 \times 16 = ?$
The dividend is $84 \times 121 \times 15 \times 81$; the divisor is $7 \times 12 \times 11 \times 3 \times 11 \times 5 \times 9$. What is the quotient?

LESSON XXIII.

1. Add $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{5}{7}$.
2. Add $\frac{3}{7}$, $\frac{5}{6}$, $\frac{31}{42}$, and $\frac{9}{14}$.
3. Add $\frac{5}{14}$, $\frac{4}{7}$, and $\frac{11}{35}$. Add $\frac{1}{2}$, $\frac{1}{11}$, and $\frac{3}{5}$.
4. Change 75 to 27ths. Reduce $\frac{10}{16}\frac{8}{8}\frac{12}{16}$ to lowest terms.
5. Product of L. C. M. of 21, 16, 24 and 32, and G. C. D. of the same numbers.

LESSON XXIV.

1. Add $\frac{5}{8}$, $\frac{11}{12}$, $\frac{13}{16}$, and $\frac{7}{48}$.
2. Add $\frac{1}{4}$, $\frac{9}{10}$, $\frac{4}{5}$, and $\frac{7}{8}$. Add $\frac{3}{4}$, $\frac{7}{9}$, and $\frac{11}{12}$.
3. Change $\frac{3}{5}$, $\frac{1}{21}$, and $\frac{3}{4}$ to their least common denominator.
Reduce $\frac{4}{10}\frac{6}{6}\frac{8}{0}\frac{0}{0}$ to its lowest terms.
4. *Reduce* $\frac{17}{35}$ *to a* fraction whose denominator is 5940.
Reduce $17\frac{1}{4}$ *to a* fraction whose denominator is 36.

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5. Divide the L. C. M. of 7, 42, 6, 9, 10, and 630, by G. C. D. of 110, 140, and 680.

LESSON XXV.

1. Find the sum of $\frac{7}{11}$, $\frac{3}{5}$, and $\frac{3}{4}$. Add $\frac{3}{8}$, $\frac{5}{6}$, and $\frac{7}{13}$.
2. Find the sum of $\frac{5}{6}$, $\frac{5}{9}$, and $\frac{5}{11}$. Add $\frac{2}{13}$, $\frac{1}{10}$, and $\frac{1}{2}$.
3. Reduce $\frac{8}{9}$ to a fraction whose denominator is 513.
   Reduce $27\frac{3}{11}$ to a fraction whose denominator is 99.
4. Reduce $7405\frac{48}{135}$ to an improper fraction.
   Reduce $\frac{8}{8}\frac{8}{7}\frac{9}{8}\frac{3}{4}\frac{8}{6}\frac{1}{8}\frac{1}{0}$ to a whole number.
5. A man gave $\frac{2}{5}$ of his property to A, $\frac{3}{11}$ of it to B, and $\frac{1}{7}$ of it to C. How much did he give to all?

LESSON XXVI.

1. Find the sum of $\$\frac{3}{11}$, $\$\frac{4}{7}$, and $\$\frac{1}{13}$. $\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}=$?
2. Reduce to their lowest terms $\frac{30}{84}\frac{9}{0}$ and $\frac{14}{33}\frac{7}{1}$.
3. Reduce $\frac{8}{2}\frac{6}{7}\frac{3}{8}\frac{5}{0}\frac{8}{8}\frac{5}{4}\frac{4}{6}\frac{7}{8}\frac{8}{2}\frac{2}{3}$ to a mixed number.
   Reduce $12466\frac{1}{6}\frac{4}{3}$ to an improper fraction.
4. Divide the product of $120\times44\times6\times7$ by $72\times33\times14$.
   What is the quotient of $21\times11\times26\times13$ divided by $14\times13\times7\times2$?
5. James gave $\$\frac{2}{5}$ to John, $\$\frac{3}{5}$ to Irving, $\$\frac{8}{11}$ to Henry, and $\$\frac{1}{6}$ to William. How much did he give to all?

NOTE.—Illustrate on the board the addition of the fractions first, then write the result with the integers, in a column, and complete the addition.

LESSON XXVII.

1. Add $3\frac{1}{4}$, $2\frac{1}{3}$, 4, and $1\frac{1}{5}$. Add $2\frac{1}{7}$, 3, $2\frac{1}{5}$, and $3\frac{1}{2}$.
2. $16+9\frac{3}{4}+25\frac{7}{3}+1\frac{1}{12}=$? $3\frac{1}{4}\times7\frac{9}{10}+12\frac{1}{5}+1=$?
3. Reduce $\frac{6}{7}\frac{4}{3}\frac{8}{5}\frac{2}{5}$ to its lowest terms.
   Divide the product of $200\times36\times30\times21$ by $9\times30\times40\times15\times14$.
4. Change $\frac{5}{1}\frac{1}{0}\frac{8}{2}\frac{4}{6}\frac{6}{7}\frac{7}{8}$ to a mixed number.
   Change $173\frac{8}{14}\frac{8}{4}$ to an improper fraction.
5. A owns $468\frac{1}{3}$ acres, B owns $500\frac{3}{20}$ acres, C $225\frac{1}{8}$ acres, and D $120\frac{1}{10}$ acres. How many acres have all?

LESSON XXVIII.

1. $2\frac{1}{2}+6+3+3\frac{3}{7}+4\frac{4}{11}+25=$?
2. $\$37\frac{1}{2}+\$10\frac{1}{11}+\$6\frac{4}{5}+\$18+\$9\frac{1}{8}=$?
3. Change $11\frac{16}{45}$ to a fraction whose denominator is 675.
   Change 97 to a fraction whose denominator is 15.

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4. Reduce $2\frac{1}{2}$, $3\frac{1}{7}$, 4, $5\frac{1}{14}$, to their least common denominator.
Reduce 3, $4\frac{1}{11}$, $2\frac{2}{5}$, and $\frac{3}{7}$, to their least common denominator.
5. I gave \$$130\frac{5}{8}$ to one man, \$$131\frac{1}{12}$ to another, and \$$77\frac{1}{3}$ to another. How many dollars did I give to all?

LESSON XXIX.

1. Find the difference between $\frac{7}{11}$ and $\frac{9}{23}$. $\frac{17}{37}$ and $\frac{4}{37}$.
2. Find the sum of $\frac{6}{7}$, $\frac{9}{10}$, $\frac{13}{14}$.
Sum of $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$, and $\frac{7}{8}$.
3. Find the sum of $\frac{3}{4}$, $12\frac{2}{3}$, $7\frac{4}{5}$, $\frac{8}{9}$, and 25.
4. Reduce to L. C. D. $4\frac{1}{10}$, $3\frac{6}{70}$, 4.
Reduce to L. C. D. $2\frac{1}{2}$, $\frac{1}{6}$, $3\frac{1}{7}$, and 2.
5. A man paid $1625\frac{3}{4}$ dollars for a lot, $5760\frac{5}{8}$ dollars for his house. What did they both cost him?

LESSON XXX.

1. From $\frac{27}{18}$ take $\frac{7}{9}$. From $\frac{19}{36}$ take $\frac{4}{7}$.
2. $\frac{14}{15}-\frac{3}{37}=?$ $\frac{37}{48}-\frac{7}{18}=?$
3. $16+9\frac{3}{4}+25\frac{7}{9}+\frac{11}{12}=?$ What is the sum of $900\frac{1}{10}$, $450\frac{1}{8}$, and $75\frac{19}{25}$?
4. Reduce 46 to a fraction whose denominator is 15.
Reduce 240 to a fraction whose denominator is 114.
5. Reduce to their least common denominator, $7\frac{3}{4}$, $5\frac{6}{11}$, 7, and 8.
Reduce $\frac{336}{384}$ to its lowest terms.

LESSON XXXI.

1. Find the difference between $\frac{3}{5}$ and $\frac{1}{4}$. $\frac{18}{27}$ and $\frac{3}{9}$.
2. Find the difference between $\frac{21}{40}$ and $\frac{18}{47}$. $\frac{13}{74}$ and $\frac{24}{43}$.
3. Change $\frac{4}{5}$, $\frac{3}{4}$, $\frac{7}{10}$, and $\frac{1}{2}$ to 20ths.
Reduce $\frac{77}{121}$ to its lowest terms.
4. Change $\frac{7}{12}$, $\frac{11}{48}$, $\frac{13}{16}$, and $\frac{1}{96}$ to their least common denominator.
5. A has \$$635\frac{5}{16}$, B \$$4271\frac{3}{48}$, C \$$1625\frac{1}{8}$. How many dollars have all?

LESSON XXXII.

1. $\frac{48}{56}-\frac{42}{77}$ equals what?
$\frac{19}{18}-\frac{7}{40}$ equals what?
2. $\frac{25}{6}-\frac{15}{7}$ equals what?
$\frac{11}{21}-\frac{1}{40}$ *equals* what?
3. *Find the P. F. of* 714. P. F. of 836.

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4. Change $\frac{47}{191}$ to a fraction whose denominator is 5921.
   Change $2\frac{1}{15}$, 6, $1\frac{1}{2}$, $\frac{3}{7}$, and $\frac{1}{10}$ to their L. C. D.
5. $\frac{2}{3}+\frac{4}{9}+3\frac{11}{16}+\frac{1}{8}=?$ $\frac{620}{780}\frac{567}{873}=?$

NOTE.—Subtraction introduced, where one is to be taken from the integer, and reduced to a fraction having for its denominator the denominator of the fraction to be subtracted.

LESSON XXXIII.

1. From 1 take $\frac{67}{100}$. $12-\frac{9}{10}=?$
2. $107-\frac{99}{100}=?$ $89-\frac{43}{44}=?$
3. $\frac{6}{18}-\frac{5}{17}=?$ $\frac{17}{20}-\frac{3}{40}=?$
4. $\frac{19}{20}-\frac{11}{16}=?$ $\frac{7}{18}-\frac{4}{21}=?$
5. A has $\$\frac{5}{8}$, finds $\$1\frac{1}{2}$, earns $\$\frac{13}{16}$, and loses $\$1\frac{1}{48}$. How many dollars has he left?

LESSON XXXIV.

1. $17-\frac{55}{72}=?$ $129-\frac{99}{1000}=?$
2. $360-\frac{100}{1000}=?$ $700-\frac{97}{100}=?$
3. $\frac{33}{40}-\frac{1}{25}=?$ $\frac{17}{20}-\frac{3}{40}=?$
4. $2\frac{8}{11}+6\frac{1}{5}+12\frac{13}{33}=?$ Reduce $\frac{11}{15}\frac{38}{05}\frac{8}{5}$ to its lowest terms.
5. In 24 pounds how many 48ths pounds?
   The dividend is $18\times56\times15\times24\times16$; the divisor is $28\times96\times45\times48$. What is the quotient?

LESSON XXXV.

1. From 36 take $\frac{27}{41}$. Subtract $\frac{44}{61}$ from 87.
2. $846-\frac{101}{112}=?$ From 100 take $\frac{28}{39}$.
3. Find the difference between $\frac{99}{100}$ and $\frac{49}{50}$.
4. $\frac{400000}{96}$? $21276\frac{27}{43}$ equals what improper fraction?
5. A man deposited in a bank, $\$5\frac{3}{16}$ Monday, $\$16\frac{48}{75}$ Tuesday, $\$7\frac{12}{50}$ Wednesday, $\$4\frac{75}{100}$ Thursday, and $\$6\frac{4}{8}$ Friday. What was the entire amount deposited?

LESSON XXXVI.

1. From 10000 take $\frac{3}{16}$. Subtract $\frac{67}{111}$ from 3001.
2. Find the difference between 70 and $\frac{1}{9}$. $3-\frac{18}{25}=?$
3. From $\frac{35}{37}$ take $\frac{13}{26}$. Subtract $\frac{8}{11}$ from $\frac{87}{91}$.
4. Find the product of the L. C. M. of 54, 81, 63, and 14, and the G. C. D. of 105 and 165.
5. There were $21\frac{3}{17}$ acres in one field, $40\frac{10}{11}$ in another, and $39\frac{2}{3}$ in another; how many acres in all?

NOTE.—Mixed numbers to be taken from integers. See previous note.

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LESSON XXXVII.

1. $135-9\frac{7}{8}=$ how many? $263-24\frac{11}{12}=$ how many?
2. $12-4\frac{2}{4}$ equals how many?
   $19-3\frac{3}{7}$ equals how many?
3. $97-\frac{15}{30}$ equals how many?
   $91-\frac{45}{50}$ equals how many?
4. In 52 weeks how many sevenths weeks?
   In $\frac{84}{6}$ weeks how many weeks?
5. Dividend is $18\times5\times9\times66$, divisor is $40\times22\times6$. What is the quotient?
   $18\times6\times4\times42\div(4\times9\times3\times7\times6\times8)=$?

LESSON XXXVIII.

1. 13 is the minuend, $9\frac{1}{11}$ the subtrahend. What is the remainder?
   14 is the minuend, $8\frac{3}{4}$ the subtrahend. What is the difference?
2. From 17 take $6\frac{1}{12}$. From 23 take $13\frac{1}{8}$.
3. From $\frac{111}{200}$ take $\frac{1}{19}$. From $\frac{1}{10}$ take $\frac{1}{1000}$.
4. L. C. M. of 3, 4, 5, 6, 7, and 8, divided by G. C. D. of 85 and 95 = ?
5. Reduce $2\frac{1}{3}$, 4, $6\frac{1}{8}$, $3\frac{3}{5}$, and $\frac{1}{2}$ to their L. C. D.
   $31\frac{3}{8}+43\frac{5}{12}+47\frac{5}{6}=$?

LESSON XXXIX.

1. From 100 take $8\frac{9}{17}$. Subtract $99\frac{9}{81}$ from 100.
2. $75-1\frac{3}{4}\frac{3}{5}=$? $1001-101\frac{9}{13}=$?
3. $142-\frac{8}{99}\frac{7}{1}=$? Find the difference between $\frac{87}{91}$ and $\frac{15}{16}$.
4. $\frac{27}{28}\times1\frac{1}{13}\times\frac{26}{35}\times\frac{7}{2}\times\frac{14}{33}\times\frac{5}{2}=$ how many 96ths?
5. A farmer raised $274\frac{3}{16}$ bushels of potatoes, $140\frac{9}{35}$ bushels of turnips, and $47\frac{7}{8}$ bushels of onions. How many bushels did he raise in all?

LESSON XL.

1. From 963 take $801\frac{47}{68}$. Subtract $88\frac{100}{101}$ from 99.
2. $3-2\frac{16}{17}\frac{3}{8}=$?
   Find the difference between $16\frac{17}{18}$ and 17.
3. Subtract $1001\frac{99}{115}$ from 1002. $97-8\frac{34}{75}=$?
4. In $22\frac{1}{2}$, $1\frac{1}{3}$, 4, $6\frac{7}{12}$, 9, $1\frac{1}{8}$, how many 24ths?
5. How many yards in three pieces of cloth, containing $42\frac{9}{25}$ yds., $37\frac{3}{10}$ yds., and $63\frac{4}{5}$ yds.?

NOTE.—**Subtraction of mixed numbers.**

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LESSON XLI.

1. $84\frac{7}{15}-16\frac{1}{3}=?$ $246\frac{3}{8}-164\frac{1}{5}=?$
2. $246\frac{7}{8}-200\frac{3}{9}=?$ $16\frac{7}{8}-5\frac{7}{9}=?$
3. $17-6\frac{11}{12}=?$ $14-8\frac{3}{7}=?$
4. $(\frac{1}{3}-\frac{1}{11})+(\frac{3}{4}+\frac{1}{3})=?$ $3-(\frac{4}{5}-\frac{1}{3})=?$
5. In 9876 days, how many 24ths days?
   Reduce $\frac{4\,3\,2\,9\,8\,7\,6\,2\,5\,2\,8\,7\,0}{7\,2\,3\,0\,1}$ days to days and the fraction of a day.

LESSON XLII.

1. $6000\frac{9}{13}-97\frac{1}{2\,6}=?$ $750\frac{1}{3}-9\frac{1}{17}=?$
2. $589-77\frac{9}{35}=?$ $8462-67\frac{3}{25}=?$
3. $(\frac{2}{3}$ of $\frac{9}{4}$ of $\frac{5}{8})+(\frac{5}{8}$ of $\frac{14}{15}$ of $\frac{9}{13})=?$
4. Reduce $\frac{3}{9}$, $\frac{5}{13}$, $\frac{2}{3}$, to 36ths.
   Reduce $\frac{6\,4\,6\,5}{8\,0\,8\,1}$ to its lowest terms.
5. A merchant bought of one manufacturer $987\frac{5}{13}$ yards, of another $7896\frac{7}{9}$ yards, and of another $700\frac{1}{3}$ yards. How many yards did he buy from all?

LESSON XLIII.

1. $67\frac{9}{16}-12\frac{3}{5}=?$ $80\frac{17}{21}-79\frac{9}{14}=?$
2. $19-4\frac{6}{9}=?$ $101-6\frac{3}{8\,1}=?$
3. $101\frac{1}{12}-89\frac{7}{13}=?$ $200\frac{1\,2}{8\,4}-13\frac{3}{7\,8}=?$
4. $(\frac{3}{7}-\frac{4}{3\,1})+(\frac{1\,3}{1\,6}+\frac{9}{8\,4})=?$ $17-(\frac{3\,9}{8\,1}-\frac{1\,2}{8\,1})=?$
5. In $943\frac{1}{3\,5}$ ounces, how many 35ths ounces?
   Reduce $\frac{2\,4\,7\,3\,6\,8}{1\,0\,8}$ ounces to ounces and the fraction of an ounce.

LESSON XLIV.

1. $1030\frac{7\,3}{8\,4}-958\frac{5}{7}=?$ $2001\frac{1\,1}{4\,2}-1990\frac{6}{1\,4\,7}=?$
2. $846-\frac{1\,7}{1\,8\,1}=?$ $74693-\frac{1\,8\,1}{2\,7\,1}=?$
3. $(\frac{7}{8}\times\frac{2\,4}{8\,1}\times\frac{3}{4})+(\frac{6}{1\,5}\times\frac{2\,6}{2\,7}\times\frac{9}{1\,0})=?$
4. Reduce $\frac{3}{6\,3}$, $\frac{4}{5}$, $\frac{6}{2\,1}$, $\frac{4}{7}$, to 63ds.
   Reduce $\frac{8\,5\,4\,0\,0}{2\,5}$ hours to a whole number.
5. A man deposited in a bank $\$475\frac{3}{8}$ Monday, $\$370\frac{7}{2\,0}$ Tuesday, and $\$400\frac{1\,2}{1\,6}$ Wednesday; Thursday he drew out $\$875\frac{7}{8}$. How much remained?

LESSON XLV.

1. $9\frac{7}{8}-5\frac{1\,1}{1\,2}=?$ $7\frac{1}{4}-3\frac{7}{9}=?$
2. $8\frac{3}{7}\times 4\frac{4}{5}=?$ $9\frac{1}{4}-3\frac{7}{8}=?$
3. $(14-8\frac{3}{7})+(1\frac{8}{3\,3}-\frac{2}{2\,8})=?$ 6 1/2 2
4. $(6\frac{1}{2}-1\frac{4}{5})-1\frac{3}{4}=?$
5. Reduce 8796 to 15ths. P. F. of 20080 = ?

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LESSON XLVI.

1. $125\frac{5}{7} - 113\frac{3}{5} = ?$ $\quad 90\frac{1}{4} - 70\frac{3}{4} = ?$
2. $750\frac{1}{13} - 496\frac{1}{2} = ?$ $\quad \frac{13}{19} - \frac{5}{13} = ?$
3. $(\frac{3}{5} + \frac{2}{3} + \frac{5}{6}) - (\frac{7}{8} + \frac{3}{4} + \frac{1}{16}) = ?$
   $(14\frac{2}{5} + 21\frac{1}{2} + 90\frac{3}{4}) - (3\frac{1}{4} + 15\frac{5}{6} + 20\frac{2}{3}) = ?$
4. Reduce $\frac{4}{7}$, $\frac{5}{14}$, $\frac{3}{28}$, to their least common denominator.
   What is the product of the least common multiple of 24, 36, 20, and the greatest common divisor of 296 and 407?
5. A lady having a fortune of $\$98760\frac{4}{17}$, gave $\$9763\frac{1}{3}$ to an asylum. How many dollars had she left?

LESSON XLVII.

1. $18\frac{3}{4} - 16\frac{7}{8} = ?$ $\quad 2711\frac{1}{16} - 143\frac{3}{8} = ?$
2. $645\frac{14}{23} - 300\frac{31}{46} = ?$ $\quad \frac{72}{81} - \frac{8}{27} = ?$
3. $(76 - 8\frac{7}{11}) + (\frac{73}{81} - \frac{11}{21}) = ?$
4. $19\frac{1}{10} - 8\frac{3}{7} - 7\frac{7}{10} = ?$
5. Reduce 9467 to 48ths. P. F. of 726000.

LESSON XLVIII.

1. $378\frac{1}{16} - 192\frac{7}{24} = ?$ $\quad 100\frac{9}{25} - 1\frac{2}{3} = ?$
2. $4500 - 90\frac{81}{88} = ?$ $\quad \frac{470}{1003} - \frac{37}{331} = ?$
3. $(\frac{3}{7} + \frac{17}{21} + \frac{9}{42}) - (1 + \frac{1}{6} + \frac{1}{7}) = ?$
   $(76\frac{3}{5} + 14\frac{5}{27} + 16\frac{2}{3}) - (8\frac{1}{2} + \frac{21}{55} + \frac{21}{9}) = ?$
4. Reduce $1\frac{5}{6}$, $\frac{7}{18}$, $\frac{11}{36}$, to their L. C. D.
   Reduce 9184 to an equivalent fraction, having 16 for a denominator.
5. James paid $\$19\frac{1}{3}$ for a coat, $\$10\frac{1}{15}$ for pants and vest, $\$5\frac{3}{4}$ for boots. He gave three ten dollar bills and two five dollar bills. How much change should he receive?

LESSON XLIX.

1. $189\frac{5}{14} - 100\frac{3}{20} = ?$ $\quad 69\frac{3}{17} - 68\frac{10}{11} = ?$
2. $(729 - 125\frac{33}{40}) + (160 - 25\frac{9}{10}) = ?$
   From $\frac{3}{5}$ of $\frac{7}{8}$ take $\frac{1}{8}$ of $\frac{5}{9} = ?$
3. $\frac{2}{5} - (\frac{1}{4}$ of $\frac{1}{5}$ of $\frac{2}{3}$ of $\frac{3}{5}$ of $\frac{7}{15}) = ?$ $\quad \frac{63}{64} - \frac{26}{45} = ?$
4. L. C. M. of 72, 120, 180, 24, 36, divided by the G. C. D. of 1879 and 2425 = ?
5. A man bought $490\frac{2}{7}$ lbs. of sugar at one time, and $784\frac{1}{13}$ *lbs. at another*; then sold $900\frac{1}{3}$ lbs. How many pounds *had he left?*

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LESSON L.

1. $25\frac{4}{7} - 13\frac{2}{3} = ?$ $179\frac{3}{4\,6} - 56\frac{8}{9} = ?$
2. What is the product of the L. C. M. of 231, 273, and the G. C D. of 154, 280?
3. Reduce $\frac{3}{8}$, $2\frac{1}{5}$, and 3 to their L. C. D.
   Reduce $\frac{4}{5}$ to 360ths.
4. $111\frac{11}{1\,0\,0\,0} = ?$ Reduce $14\frac{2}{5}$ weeks to 40ths.
5. A man deposited $\$1780\frac{4}{1\,6}$ one week in a bank; the succeeding week $\$987\frac{3}{5}$; and the third week drew out $\$1000\frac{7}{1\,0}$. How many dollars had he remaining in the bank?

LESSON LI.

1. $100\frac{3}{8\,9} - 99\frac{2}{3\,7} = ?$ $876\frac{1}{3} - 47\frac{2\,0}{2\,1} = ?$
2. $(800 - 786\frac{2}{3\,1}) + (153 - 100\frac{1\,7}{6\,2}) = ?$
   From $\frac{9}{1\,0}$ of $\frac{2\,0}{2\,7}$ take $\frac{1}{1\,6}$ of $\frac{8}{1\,1}$ of $\frac{2\,2}{2\,5}$.
3. $\frac{1\,5}{1\,6} - (\frac{2}{3}$ of $\frac{5}{7}$ of $\frac{2\,1}{4\,8}) = ?$ $\frac{5\,4}{5\,5} - \frac{1\,0}{1\,1} = ?$
4. The L. C. M. of 23, 92, 115, 69, divided by the G. C. D. of 1402, 728, 104 = ?
5. A man deposited in bank $14763\frac{3}{4\,5}$ dollars, and the following week drew out $9654\frac{8}{1\,5}$ dollars; what amount still remained to his credit?

LESSON LII.

1. $300\frac{7\,1}{1\,0\,0\,0} - 289\frac{4}{6} = ?$ $497\frac{1}{1\,0\,0} - 397\frac{1}{1\,0} = ?$
2. The product of the L. C. M. of 18, 72, 162, 50, and the G. C. D. of 360, 234 = ?
3. Reduce 7, $\frac{3}{1\,6}$, $9\frac{1}{8}$, $\frac{1\,7}{5\,0}$, to their least common denominator.
   Reduce $480\frac{1}{3}$ to 72nds.
4. From 1000 take $89\frac{4\,5}{6\,1}$, three times.
5. If, in repairing a house, the bills were as follows: painting $\$85\frac{7}{1\,0}$, plastering $\$14\frac{2\,3}{5\,0}$, plumbing $\$49\frac{4}{7}$, and carpenter's bill $107\frac{4}{5}$, what was the entire cost?

LESSON LIII.

1. $190\frac{1}{7} \times 45\frac{7}{8} = ?$ $900\frac{1}{1\,3} - 96\frac{8}{7} = ?$
2. $490\frac{1}{1\,1} - 300\frac{4}{5} = ?$ $687\frac{5}{1\,1} - 686\frac{2}{1\,3} = ?$
3. The G. C. D. of 231, 273 = ?
   The L. C. M. of 63, 12, 87, and 7 = ?
4. The P. F. of 3420 = ? $\frac{1\,0}{8}$ of $\frac{4}{5}$ of $\frac{2\,4}{6}$ of $\frac{4}{1\,6}$ of $\frac{7}{2\,8} = ?$
5. How many yards in 3 pieces of cloth containing $42\frac{3}{4\,0}$ yards, $37\frac{3}{1\,0}$ yards, and $63\frac{1}{5}$ yards?

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LESSON LIV.

1. $178\frac{1}{13}-177\frac{2}{3}=?$ $196\frac{3}{11}-100\frac{1}{9}=?$
2. $384\frac{1}{7}-296\frac{1}{13}=?$ $490\frac{1}{18}-327\frac{1}{7}=?$
3. Reduce $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, and 3 to their least common denominator. Reduce $140\frac{3}{4}$ lbs. to 24ths lbs.
4. Reduce $\frac{8}{11}$ to a fraction having for its denominator 49. Reduce $\frac{2}{3}$ of $\frac{4}{5}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{1}{3}$ of $\frac{1}{4}$ of 6 to a simple fraction.
5. There were $21\frac{3}{17}$ acres in one field, $40\frac{1}{3}$ in another, and $39\frac{2}{3}$ in another. How many acres in all?

LESSON LV.

NOTE.—Introduction of multiplication of fractions.

1. $\frac{2}{3}\times 5\times\frac{3}{4}\times 7=?$ $\frac{4}{15}\times 12\times 2\frac{1}{2}\times 7=?$
2. $1\frac{7}{16}\times 48=?$ $4\frac{5}{36}\times 18=?$
3. $198\frac{3}{11}-197\frac{13}{14}=?$ $1000\frac{3}{17}-999\frac{1}{3}=?$
4. If one pound of wool costs $39\frac{1}{3}$ cents, what will 175 pounds cost?
5. A boy had $6\frac{1}{2}$ times $7\frac{1}{2}$ dollars, and spent $5\frac{1}{2}$ dollars. How many dollars had he left?

LESSON LVI.

1. $18\frac{1}{3}\times 7=?$ $91\frac{3}{11}\times 18=?$
2. $91\frac{1}{7}\times\frac{3}{14}=?$ $400\frac{3}{5}\times 4\frac{1}{3}=?$
3. Reduce $\frac{1}{3}$, $\frac{2}{4}$, $2\frac{1}{3}$, and 4 to fractions having 60 for their denominator. $(4\frac{1}{3}-3\frac{2}{3})+\frac{1}{7}=?$
4. A has $\frac{3}{8}$ of 24 dollars, B $\frac{2}{3}$ of 270 dollars, C $\frac{1}{3}$ of 211 dollars, D $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of 16 dollars. How many dollars have all?
5. Reduce $\frac{1}{3}$ of $\frac{2}{10}$ of $\frac{1}{10}$ of $\frac{2}{7}$ of $\frac{11}{12}$ of $\frac{10}{10}$ of $\frac{10}{10}$ to a simple fraction.

LESSON LVII.

1. $15\times 30\frac{1}{3}=?$ $\frac{17}{40}\times 8=?$
2. $18\frac{3}{4}\times 13\frac{1}{3}=?$ $42\times 63\frac{2}{3}=?$
3. $\frac{9}{25}$ of $3\frac{1}{3}$ of $7\frac{2}{3}$ of $\frac{9}{25}$ of $2\frac{1}{4}=?$ $\frac{24}{60}\times 30=?$
4. What is the cost of 15 pounds, at $9\frac{1}{3}$ cents a pound?
5. A man bought a bill of goods amounting to $85\frac{3}{16}$ dollars; he gave the merchant a $100 bill. What change should he receive?

LESSON LVIII.

1. $98\times 60\frac{1}{6}=?$ $100\times 18\frac{3}{25}=?$
2. $20\frac{1}{3}\times 80\frac{3}{4}=?$ $16\frac{3}{5}\times 12\frac{3}{4}=?$

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3. What is the cost of 25 pieces of tape, at $26\frac{3}{8}$ cents each?
4. A grocer having 1000 pounds sugar, sold to one man $16\frac{1}{4}$ pounds, to another $33\frac{1}{2}$ pounds, and to another $112\frac{1}{8}$ pounds. How many pounds had he left?
5. If a car runs $50\frac{1}{2}$ miles an hour, how far will it run in 14 days, running 12 hours a day?

LESSON LIX.

1. $7\frac{3}{14} \times 49 = ?$ $\quad 1\frac{7}{12} \times 52 = ?$
2. $7\frac{1}{5} \times 1662 = ?$ $\quad \frac{5}{6} \times 1000 = ?$
3. $272 \times \frac{1}{3} = ?$ $\quad 864 \times \frac{1}{4} = ?$
4. $2000 - 100\frac{3}{8}$ four times $= ?$
5. If a coat cost $\$26\frac{3}{4}$, pants $\$9\frac{1}{4}$, vest $\$6\frac{1}{4}$, hat $\$5\frac{1}{2}$, boots $\$6\frac{1}{4}$, what is the cost of all?

LESSON LX.

1. $635 \times \frac{2}{5} = ?$ $\quad 480 \times \frac{3}{8} = ?$
2. Reduce to its lowest terms $\frac{12}{100}\frac{4}{8}$. Reduce $\frac{3}{7}\frac{3}{1}\frac{3}{3}$.
3. $485\frac{1}{16} - 327\frac{7}{32} = ?$ $\quad 1\frac{2}{3}\frac{9}{0}$ — two times $\frac{1}{6} = ?$
4. The P. F. of $360 = ?$ $\quad$ Of $720 = ?$
5. A man owned $748\frac{7}{10}$ acres of land. He sold $100\frac{7}{8}$ acres at one time, $204\frac{7}{16}$ acres at another, and $97\frac{4}{5}$ acres at another. How many acres had he left?

LESSON LXI.

1. $471 \times \frac{4}{11}\frac{1}{7} = ?$ $\quad 871 \times \frac{2}{3}\frac{3}{7} = ?$
2. $\frac{11}{12} \times 166 = ?$ $\quad \frac{15}{17} \times 278 = ?$
3. $16\frac{4}{5} \times 15\frac{1}{3} = ?$ $\quad 76\frac{1}{2} \times 7\frac{3}{5} = ?$
4. A man had $\$10$. He gave away $\$2\frac{1}{8}$, $\$3\frac{1}{4}$, $\$1\frac{1}{2}$. How many dollars has he left?
5. A man's estate consists of $\$57685\frac{1}{12}$ in a bank, $\$43654\frac{8}{10}$ in real estate, and personal property to the amount of $\$1654\frac{3}{16}$. What is the value of his estate?

LESSON LXII.

1. $17\frac{3}{4} \times 12\frac{1}{2} = ?$ $\quad 14\frac{3}{5}$ times $37\frac{1}{2} = ?$
2. $845 \times 27\frac{3}{16} = ?$ $\quad 100 \times 97\frac{7}{12} = ?$
3. Find $\frac{3}{4}$ of $240 \times \frac{7}{12}$. $\quad 630 - 575\frac{4}{8}\frac{5}{5} = ?$
4. What is the cost of 15 cords of wood, at $\$6.37\frac{1}{2}$ a cord? What is the cost of $8\frac{3}{4}$ cords of wood, at $\$5\frac{3}{8}$ a cord?
5. A man bought 6 chairs, at $\$4\frac{3}{8}$ each, and gave in payment 1 twenty dollar bill and 2 five dollar bills. What was his change?

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LESSON LXIII.

1. $8\frac{4}{25} \times 19\frac{4}{11} = ?$ $70\frac{1}{3} \times 16\frac{3}{40} = ?$
2. $496\frac{3}{13} - 495\frac{13}{16} = ?$ $684\frac{3}{5} - 600\frac{3}{4} = ?$
3. A man had $9\frac{3}{4}$ dollars, and paid $3\frac{1}{3}$ dollars for boots, and $4\frac{5}{8}$ dollars for a hat. How much money had he left?
4. A man gave to a customer $3\frac{7}{8}$ dollars in change, and afterwards found that it was $\frac{1}{8}$ of a dollar too much. How much ought he to have given him?
5. $\frac{3}{5}$ of $12\frac{1}{6} - \frac{2}{3}$ of $9\frac{7}{12} = ?$

LESSON LXIV.

1. $78 \times 9\frac{3}{8} = ?$ $144 \times 60\frac{1}{12} = ?$
2. $178\frac{1}{3} - 177\frac{11}{18} = ?$ $496\frac{1}{5} - 400\frac{11}{20} = ?$
3. Reduce $14\frac{3}{4}$, $6\frac{2}{3}$, $5\frac{1}{2}$, and 6 to their least common denominator. Reduce $\frac{40}{13}$ to a fraction whose denominator is 65.
4. A man had $\frac{4}{5}$ of $\frac{5}{6}$ of $7\frac{1}{2}$ times 7862 dollars, and gave $\frac{3}{4}$ of it for a farm. What was the cost of the farm, and how many dollars had he left?
5. What is $\frac{11}{12}$ of $262.80?

LESSON LXV.

1. $100\frac{3}{7} \times 49\frac{7}{8} = ?$ $165\frac{4}{7} \times 37\frac{7}{10} = ?$
2. $937\frac{3}{16} - 54\frac{7}{8} = ?$ $400\frac{1}{9} - 100\frac{3}{8} = ?$
3. Multiply the sum of 1, $\frac{3}{16}$, $5\frac{1}{4}$, $\frac{7}{24}$, by the product of $2\frac{7}{8}$, $\frac{1}{10}$, $1\frac{3}{15}$, $\frac{3}{4}$.
4. The sum of two numbers is $12\frac{7}{16}$, and one of them is $7\frac{3}{8}$; what is the other number?
5. A carriage cost $758\frac{1}{36}$ dollars, two horses $275\frac{3}{8}$ dollars each, harness &c. $125\frac{7}{12}$ dollars. What was the entire cost?

LESSON LXVI.

1. $800\frac{1}{11} \times 30\frac{3}{16} = ?$ $400\frac{4}{5} \times 78\frac{47}{111} = ?$
2. Reduce $3\frac{1}{2}$, $7\frac{1}{8}$, 5 to equivalent fractions having their least L. C. D.
3. Change $\frac{47}{50}\frac{3}{45}\frac{0}{76}\frac{7}{80}$ to a mixed number. " " $4938\frac{7}{9}\frac{9}{8}\frac{9}{74}$ to an improper fraction.
4. A man had $120. He gave away at different times, $14\frac{3}{8}$, $12\frac{5}{8}$, $50\frac{3}{4}$. How much money had he left?
5. A man bought $20\frac{3}{4}$ yds. of cloth, at $4\frac{3}{4}$ per yd., $33\frac{1}{3}$ yds. at $2\frac{1}{2}$ per yd. How many yards did he buy, and what was the entire cost?

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LESSON LXVII.

1. $19\frac{4}{15} \times 30\frac{3}{4} = ?$ $20\frac{1}{9} \times 3\frac{2}{13} = ?$
2. $1000\frac{3}{7} - 999\frac{1}{8} = ?$ $480\frac{3}{5} - 479\frac{13}{14} = ?$
3. $9\frac{1}{4} - 3\frac{7}{8} = ?$ $61\frac{11}{17} - 33\frac{13}{14} = ?$
4. What is the cost of 148 bushels of oats, at $39\frac{1}{2}$ cents a bushel?
5. A man having a fortune of 9000 dollars, gave to his wife $4000\frac{1}{7}$ dollars, to his son $1250\frac{4}{5}$ dollars, and to his daughter $1000\frac{1}{7}$ dollars. How many dollars had he left?

LESSON LXVIII.

1. $24\frac{3}{4} \times 60\frac{1}{11} = ?$ $28\frac{3}{7} \times 100\frac{1}{3} = ?$
2. $400\frac{1}{13} - 399\frac{11}{12} = ?$ $864\frac{1}{2} - 863\frac{16}{17} = ?$
3. Reduce $\frac{8}{40}$ to a fraction whose denominator is 320.
   Reduce $119\frac{4}{13}$ to an equivalent fraction having 117 for its denominator.
4. $(\frac{1}{2} + \frac{3}{5} + \frac{1}{5}) \times (\frac{3}{4}$ of $\frac{7}{8}$ of $16) = ?$
   The divisor is $3\frac{1}{2}$, the quotient is $\frac{4}{7}$; what is the dividend?
5. A man owing a debt of 1200 dollars, gave in payment merchandise worth $420\frac{3}{8}$ dollars, and 6 chairs at $10\frac{5}{6}$ dollars each, and the rest in cash. How much cash did he give?

NOTE 1.—Division of Fractions.

NOTE 2.—In the analysis of concrete examples, the shortest method should be adopted. See Ex. 5, Lesson 70.

LESSON LXIX.

1. $\frac{3}{5} \div \frac{3}{4} = ?$ $\frac{1}{6} \div \frac{3}{5} = ?$ $\frac{3}{7} \div \frac{7}{12} = ?$ $\frac{1}{5} \div \frac{7}{10} = ?$ $\frac{3}{4} \div \frac{3}{4} = ?$
2. $\frac{9}{11} \div \frac{3}{5} = ?$ $\frac{43}{48} \div \frac{7}{21} = ?$
3. $45\frac{1}{7} - 36\frac{1}{3} = ?$ $1\frac{1}{3} + 8 + 10\frac{3}{14} + 9\frac{1}{2} = ?$
4. A has $8964, which is $1\frac{1}{3}$ times as much as B has. How much has B?
4. A grocer bought 1200 pounds of sugar; he sold at one time $132\frac{11}{13}$ lbs., at another $240\frac{3}{4}$ lbs. and at another $429\frac{7}{8}$ lbs. How many pounds had he left?

LESSON LXX.

1. $\frac{3}{4}$ of $\frac{3}{4} \div \frac{1}{7}$ of $\frac{7}{8} = ?$ $\frac{4}{7}$ of $\frac{14}{6}$ of $\frac{8}{9} \div \frac{5}{9}$ of $\frac{3}{8}$ of $\frac{1}{10} = ?$
2. What is the quotient of the L. C. M. of 360, 600, 720, divided by the G. C. D. of 48, 144, 72, 96?
3. What is the cost of 240 tons of coal, at $9\frac{1}{7}$ dollars a ton?

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4. A man has $3908, with which he purchases horses at $97\frac{7}{10}$ dollars each. How many does he buy?
5. A speculator invests $3050\frac{1}{4}$ in wheat, twice as much in corn, and three times as much in pork. What was the entire investment?

LESSON LXXI.

1. $4\frac{3}{4} \div \frac{8}{10} = ?$ $\frac{2}{11} \div \frac{11}{50} = ?$
2. $\frac{\frac{3}{4} \text{ of } \frac{2}{5}}{2\frac{1}{3}} = ?$ $8\frac{2}{3} \div 1\frac{3}{14} = ?$
3. $900\frac{1}{7} - 899\frac{1}{12} = ?$ $1000\frac{1}{18} - 999\frac{13}{14} = ?$
4. What is the cost of $304\frac{3}{4}$ pounds of beef, at $7\frac{1}{2}$ cents per pound?
5. A clerk received a salary of 1800 dollars per annum; he spent $32\frac{7}{16}$ dollars a month for board, $7\frac{4}{5}$ dollars for clothing, and $10\frac{3}{4}$ dollars for incidentals. How much had he left at the close of the year?

LESSON LXXII.

1. $\frac{6}{7}$ of $7\frac{3}{5} \div \frac{8}{7}$ of $\frac{5}{9} = ?$ $\frac{8}{16} \times 3\frac{3}{12} \div \frac{1}{2}$ of $18 = ?$
2. $\frac{\frac{3}{4} \text{ of } \frac{8}{9}}{\frac{6}{5} \text{ of } 1\frac{2}{11}} = ?$ Divide $3\frac{1}{3}$ of $4\frac{2}{5}$ of 22 by $6\frac{1}{2}$ of $\frac{4}{5}$.
3. What is the cost of $19\frac{1}{5}$ cords of wood at $8\frac{1}{4}$ dollars per cord?
4. A man spent $112\frac{1}{2}$ for sheep, giving $1\frac{1}{2}$ per head. How many sheep did he buy?
5. What is the entire cost of 6 chairs at $4\frac{1}{3}$ dollars apiece, and 3 writing desks at $30\frac{3}{4}$ dollars each?

LESSON LXXIII.

1. $(3\frac{1}{3} \div 3\frac{1}{4}) \times (4\frac{1}{2} \times 2\frac{1}{3}) = ?$ $13\frac{7}{8} \div \frac{5}{8} = ?$
2. $(\frac{3}{5} \text{ of } 75) \times (\frac{2}{5} \text{ of } 28) = ?$ $(8\frac{1}{7} \text{ of } \frac{3}{5\frac{1}{7}} \text{ of } 1\frac{1}{12}) \div (3\frac{3}{8} \text{ of } 6\frac{2}{7}) = ?$
3. A man after investing $36000 in real estate, found he had $\frac{9}{11}$ of his money invested; how much had he?
4. At $2\frac{1}{4}$ each for sheep, $47\frac{1}{2}$ each for cows, and $79\frac{5}{18}$ each for horses, what amount will be required to purchase 20 sheep, 3 cows, and 4 horses?
5. A farmer having 640 tons of hay, sold $125\frac{3}{8}$ tons at $12\frac{1}{2}$ a ton, $204\frac{1}{8}$ tons at $11 per ton. How much money did he receive, and how many tons had he remaining?

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LESSON LXXIV.

1. $(18\frac{3}{4}+16\frac{5}{12}+11\frac{2}{3})\div(\frac{7}{8}+\frac{1}{2}+\frac{3}{4})=?$ $18\frac{4}{7}\div 1\frac{12}{21}=?$
2. $(\frac{1}{7}+\frac{2}{14}+\frac{1}{6})-(\frac{1}{3}+\frac{7}{15}+\frac{1}{5})=?$ $900\frac{1}{8}-800\frac{7}{9}=?$
3. $(\frac{2}{3}\div\frac{6}{11})\times(\frac{1}{3}\times\frac{1}{7})\times(3+1\frac{1}{4}+\frac{3}{16})=?$
4. From \$100, a man used at different times \$$12\frac{2}{3}$, \$$4\frac{17}{20}$, \$$10\frac{21}{25}$, \$15, \$$3\frac{7}{12}$. What was the amount used, and how much remained?
5. A farmer sold 1680 bushels of grain, which was $\frac{3}{5}\frac{1}{6}$ of all he raised; how many bushels did he raise?

LESSON LXXV.

1. $(\frac{2}{10}\div\frac{5}{6})+(2\frac{1}{2}\div\frac{5}{7})=?$ $(7\frac{1}{3}\div 3\frac{1}{3})\times(3\frac{1}{3}\div 4\frac{2}{12})=?$
2. $(270-90\frac{7}{8})-(25\frac{1}{4}-13\frac{2}{8})=?$
3. Divide $\frac{4\frac{1}{2}}{2\frac{1}{4}}$ by $\frac{\frac{1}{3}}{1\frac{2}{3}}$. $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{5}+\frac{1}{8}+\frac{1}{2}+\frac{2}{5}=?$
4. A has 540 sheep, which is $\frac{2}{3}$ of $3\frac{1}{3}$ times as many as B has. How many sheep has B?
5. How much more than $9\frac{1}{2}$ yards of ribbon, at 4 cents a yard, will $6\frac{1}{4}$ yards of calico cost at 11 cents a yard?

LESSON LXXVI.

1. Divide $\frac{4\frac{1}{7}\text{ of }9\frac{1}{12}}{6\frac{1}{2}\times 3\frac{1}{3}}$ by $12\frac{1}{2}$.
   What is the value of $\frac{7}{8}$ of $\frac{4}{5}$ divided by $9\frac{1}{2}\times 36$?
2. From $30\frac{5}{8}-13\frac{2}{3}$ take $(\frac{1}{2}+\frac{2}{3}+\frac{5}{6})$.
   $(\frac{2}{3}+\frac{3}{4}+\frac{5}{6}+\frac{17}{18})-(\frac{2}{3}+\frac{3}{4}+\frac{5}{6})=?$
3. $\frac{2\,8\,7\,6\,0\,5\,0\,3\,2\,3\,2}{9\,8\,7\,6\,4}=?$ $9876548\frac{3}{9\,8\,7\,6}=?$
4. If one horse eats $7\frac{1}{5}$ pecks of oats in 3 days, how many horses will $71\frac{3}{5}$ pecks supply for the same time?
5. What is the cost of 8 barrels of flour, at $8\frac{1}{5}$ dollars per barrel, and 3 tubs of butter, at $27\frac{3}{4}$ dollars per tub?

LESSON LXXVII.

1. $\frac{4\frac{1}{3}}{\frac{5}{6}\text{ of }4\frac{1}{2}}=?$ $\frac{\frac{4}{5}\text{ of }2\frac{1}{2}}{\frac{5}{12}\text{ of }\frac{6}{25}}=?$
2. $(17+\frac{1}{2}\text{ of }\frac{2}{5})-(14\frac{1}{5}-6\frac{7}{8})=?$ $900-\frac{77}{11}=?$
3. A grocer bought $243\frac{7}{15}$ lbs. of tea for \$$72\frac{7}{15}$, $145\frac{8}{45}$ lbs. of coffee for \$$77\frac{8}{9}$, $654\frac{3}{5}$ lbs. of rice for \$$42\frac{7}{4}$. How many pounds did he buy, and what was the entire cost?
4. From $864\frac{7}{16}$, take the sum of 13, $4\frac{3}{5}$, $\frac{24}{40}$, $1\frac{28}{50}$, and $72\frac{1}{2}$.
5. A merchant invested \$680 in cloth, at $5\frac{2}{3}$ dollars a yard, \$520 in cloth, at \$$4\frac{1}{3}$ a yard; how many yards did he purchase?

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LESSON LXXVIII.

1. $\frac{\frac{3}{5} \text{ of } 3 \text{ of } \frac{1}{7}}{140} \div \frac{16}{350} = ?$ $\left(\frac{\frac{4}{5} \text{ of } \frac{4}{5} \text{ of } \frac{3}{5}}{1\frac{4}{5} \text{ of } \frac{3}{14}} \div (19 \div 3\frac{1}{11}) = ?\right.$

2. Reduce $27\frac{3}{17}$ to an equivalent fraction, having 136 for its denominator.

   Reduce $1\frac{3}{11}\frac{4}{7}$ to an equivalent fraction, having 407 for its denominator.

3. A farmer had $278\frac{3}{11}$ bushels of apples, to put into barrels holding $3\frac{1}{3}$ bushels each; how many barrels were required?

4. What is the sum of $\frac{7}{16}$ of 360, 87, $\frac{7}{16}$ of 248, $144\frac{1}{2}$, and $\frac{21}{256}$?

5. A man bought $\frac{7}{8}$ of a share of a silver mine at one time, $\frac{5}{64}$ at another, $\frac{3}{32}$ at another, and $1\frac{1}{16}$ at another. How many shares did he then own, and what was their value, at $100 a share?

LESSON LXXIX.

1. Reduce $\frac{6\frac{3}{5}}{\frac{2}{15}}$ to a simple fraction.

   Reduce $\frac{7\frac{1}{11}\frac{1}{2}}{3\frac{1}{6}}$ to mixed numbers.

2. What is the quotient of $\frac{6\frac{1}{2}}{4\frac{1}{4}}$ divided by $\frac{5}{8}$? $\frac{2\frac{1}{3}}{\frac{1}{17}\frac{1}{28}} = ?$

3. If one man earns $7\frac{1}{3}$ dollars in a day, and another $9\frac{1}{4}$ dollars in a day, how much will they both earn in $3\frac{1}{2}$ days?

4. If 22 men consume a quantity of meat in $43\frac{1}{2}$ days, how long will $5\frac{1}{4}$ times the same quantity last them?

5. A man bought wheat at the rate of $\frac{9}{10}$ of a dollar per bu., and sold it at $1\frac{1}{20}$ dollars per bu. How much did he make on $138\frac{1}{3}$ bushels?

LESSON LXXX.

1. What is the value of $\frac{\frac{3}{4}}{\frac{6}{5} \times \frac{5}{7}} + (3\frac{7}{8} \div \frac{9}{10}) - 1\frac{3}{16}$?

   Change $\frac{10}{12}\frac{8}{3}$ to a fraction having 1342 for its denominator.

2. What number must be multiplied by $\frac{1}{11}\frac{7}{9}$ to make the product 100?

3. If 4 men earn $20\frac{1}{2}$ dollars in a day, how long will it take them to earn 100 dollars?

4. A man bought apples at the rate of 80 cents a barrel, and

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sold at \$1.20 a barrel. How much did he make on $98\frac{1}{4}$ barrels?

5. A has \$14700, which is $1\frac{7}{8}$ times as much as B has. How many dollars has B?

LESSON LXXXI.

1. Reduce $\frac{14}{63}\frac{19}{51}$ to its lowest terms.
If $\frac{5}{8}$ is the minuend, and $\frac{3}{5}$ the remainder, what is the subtrahend?
2. $\frac{2}{3}$ of $\frac{18}{20}$ of $\frac{14}{40} \div \frac{1}{2}$ of $\frac{16}{32}$ of $\frac{17}{40} = ?$
$(\frac{2}{7} + \frac{9}{14} + \frac{1}{2}) \div (\frac{2}{3} + \frac{1}{2} + \frac{5}{6}) = ?$
3. If a suit costs \$80.80, and a pair of boots $\frac{1}{10}$ as much, what is the cost of all?
4. At the rate of $52\frac{1}{2}$ miles an hour, how long will it take a train to run $5420\frac{5}{8}$ miles?
5. At the rate of $\frac{3}{4}$ of a dollar a pound, how many pounds can be bought for $\frac{15}{16}$ of a dollar?

LESSON LXXXII.

1. Multiply $\frac{\frac{2}{7}}{\frac{3}{4}}$ by $\frac{\frac{1}{2}}{\frac{5}{7}}$ by $\frac{\frac{6}{11}}{\frac{2}{5}}$.

What is the product of $\frac{2\frac{1}{3}}{2\frac{1}{4}}$ multiplied by $\frac{4\frac{1}{2}}{2\frac{1}{3}}$?

2. Divide $\frac{4\frac{1}{2}}{2\frac{1}{4}}$ by $\frac{\frac{1}{3}}{1\frac{2}{4}}$.

Reduce $\frac{1\frac{3}{4}}{4\frac{1}{2}}$ divided by $\frac{2\frac{1}{3}}{2\frac{1}{4}}$ to a simple fraction.

3. If a hat costs $\frac{1}{4}$ of $16\frac{3}{4}$ dollars, and a vest $\frac{2}{3}$ as much, what is the cost of the vest?
4. If 27 barrels of flour cost $\$283\frac{1}{2}$, what will 120 barrels cost?
5. A house costs \$6300, which is $1\frac{3}{4}$ times the value of the lot. What is the value of the lot?

LESSON LXXXIII.

1. Divide $\frac{4\frac{1}{2}}{2\frac{1}{4}}$ by $\frac{\frac{2}{3}}{3\frac{1}{2}}$.

Reduce $\frac{4\frac{2}{14}}{\frac{2}{16}}$ divided by $\frac{6\frac{1}{2}}{7\frac{1}{2}}$ to a simple fraction.

2. From $19\frac{1}{6}$ take $14\frac{3}{11}$. From $20\frac{1}{7}$ take $16\frac{1}{4}$.
3. A man paid $\$1087\frac{1}{2}$ for a farm, at a cost of $\$21\frac{3}{4}$ per acre. *How many* acres did he buy?

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4. How much more will 8 bushels of wheat, at $1.20 per bushel cost, than 5 bushels of oats, at $\frac{4}{5}$ of a dollar a bushel?
5. Divide $14400 between A and B, so that A shall have $\frac{3}{4}$ as much as B.

LESSON LXXXIV.

1. Divide $\frac{5\frac{1}{6}}{7}$ by $\frac{\frac{7}{12}}{15\frac{3}{4}}$. Divide $\frac{8}{3\frac{1}{4}}$ by $\frac{\frac{24}{45}}{\frac{32}{39}}$.
2. $198\frac{3}{7}-197\frac{1}{15}=?$ $500\frac{1}{11}-499\frac{1}{15}=?$
3. A man had a fortune of $24468, and squandered $\frac{3}{4}$ of it. How much money had he left?
4. A has $6\frac{1}{2}$ times $8\frac{3}{4}$, B has $2\frac{1}{7}$ times $7\frac{1}{6}$. How much more has A than B?
5. If a garrison consume $98600\frac{5}{16}$ pounds of meat in 6 months, how many pounds will be required to last 5 garrisons the same length of time?

LESSON LXXXV.

1. $613\frac{4}{7}\div 8\frac{1}{3}=?$ $46\frac{1}{2}+(6\frac{3}{4}\div\frac{4}{5})=?$
2. If $76\frac{3}{4}$ bushels of oats are worth $26\frac{13}{20}$ dollars, what is one bushel worth?
3. What are the prime factors of 75075?
   Reduce $\frac{18}{35}\frac{34}{17}\frac{28}{52}$ to its lowest terms.
4. What is the cost of 7 pieces of cloth, each piece containing $26\frac{3}{8}$ yards, at $2\frac{1}{3}$ dollars a yard?
5. A deposited in a bank $6900, which was $2\frac{1}{3}$ times as much as B had deposited. What amount had B deposited?

LESSON LXXXVI.

1. $246\frac{1}{8}\div 35\frac{1}{2}=?$ $\frac{3}{4}\div\frac{4\frac{2}{3}}{4\frac{3}{7}}$ of $\frac{3}{16}=?$
2. In $870\frac{3}{16}$ pounds how many 112ths pounds?
   Reduce $\frac{2}{1}\frac{8}{2}\frac{6}{8}$ to an equivalent frac. having 1408 for its denom.
3. $84\frac{5}{7}-\frac{5}{14}+(\frac{18}{4}\div\frac{1}{8})=?$ $18-3\frac{2}{7}+5\frac{5}{14}=?$
4. If I have to my credit in bank $3500, and draw out at different times, $141\frac{3}{4}$, $467\frac{3}{5}$, $417\frac{1}{10}$, and $348\frac{6}{11}$, how much have I still on deposit?
6. A man sold his farm for $4690, which was $1\frac{3}{7}$ times its cost. What was its cost, and what was his gain?

LESSON LXXXVII.

1. *Divide* $\frac{4\frac{4}{8}}{3\frac{2}{5}}$ of $\frac{4\frac{2}{3}}{5\frac{1}{4}}$ of $\frac{1\frac{8}{24}}{2\frac{1}{16}}$ by $\frac{6}{66}$ of $\frac{3\frac{1}{2}}{8\frac{8}{8}}$ of $\frac{8}{8}$ of 5.
   $9804-6611=?$

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2. To the product of $8\frac{1}{3}$ times $5\frac{1}{4}$, add the product of $8\frac{1}{4}$ and $7\frac{1}{3}$. Divide the product of $3\frac{3}{4}$ and $3\frac{1}{3}$ by the sum of $2\frac{1}{2}$ and $\frac{5}{14}$.
3. At \$4 per foot, how much molding can be bought for \$$3\frac{3}{5}$? By selling $4\frac{1}{2}$ gallons of wine, at \$$6\frac{1}{4}$ per gallon, I gain \$$5\frac{1}{8}$. What did the wine cost me?
4. When $19\frac{1}{2}$ lbs. cost \$$11\frac{1}{2}$, how many lbs. can be bought for \$$5\frac{3}{4}$?
5. $\frac{2871549320}{93873}$ = ? $9876875_{97\,86}$ = ?

LESSON LXXXVIII.

1. Divide $\frac{2}{42}$ of 7 of $\frac{63}{100}$ of 42 by $15\frac{3}{4}$ of $\frac{8}{10}$ of $\frac{3}{4}$. $900\frac{1}{16} - 99\frac{11}{12}$ = ?
2. $\frac{8}{9}$ of $\frac{10}{12}$ of $\frac{8}{15} \div (\frac{1}{2} + \frac{3}{8} + \frac{1}{11})$ = ? $777\frac{1}{17} - 776\frac{1}{12}$ = ?
3. How much more will $18\frac{3}{4}$ yards of flannel cost, at \$$3\frac{1}{4}$ per yard than 50 yards of calico, at 12 cents a yard?
4. If \$$33\frac{1}{3}$ will pay for $4\frac{2}{3}$ barrels of flour, how many barrels can be bought for \$27.50?
5. When $8\frac{4}{5}$ tons will feed 22 horses a certain time, how many horses will $14\frac{2}{5}$ tons supply for the same time?

LESSON LXXXIX.

1. $13 + \frac{5}{8} - 6\frac{3}{4}$ = ? $\frac{4}{7} + 16 - \frac{3}{11} + (\frac{3}{7} - \frac{3}{14})$ = ?
2. $(8 \div 11) + (3 \div 9)$ = ? $5\frac{2}{3} + \frac{3}{4} - \frac{6}{7} + (\frac{3}{5} + 13)$ = ?
3. Dividend $\frac{7}{8}$, quotient $\frac{4}{30}$, what was the divisor?
4. How many lemons can be bought for $2\frac{1}{3}$ times $\frac{1}{7}$ of \$24, when they cost $\frac{1}{3}$ of $\frac{8}{11}$ of $2\frac{2}{3}$ cents each?
5. A farm cost \$19000, which was $1\frac{8}{11}$ times the cost of the improvements. What did the improvements cost?

LESSON XC.

1. What is the quotient of $\frac{9\frac{1}{2}}{\frac{8}{11} \text{ of } \frac{22}{16}}$ divided by $\frac{9 \times 2\frac{2}{3}}{\frac{1}{16} \text{ of } 3 \text{ times } 14}$?
2. $999\frac{1}{11} - 900\frac{11}{12}$ = ? $482\frac{5}{17} - 90\frac{13}{16}$ = ?
3. $4\frac{1}{4} + 1\frac{1}{3} + 4\frac{7}{11} - 7\frac{7}{12}$ = ?
   If 7 tons cost \$28.14, what is the cost of $9\frac{5}{8}$ tons?
4. If 6 turkeys cost \$$8\frac{1}{4}$, how many can be bought for \$154?
5. How many pounds of tea, at \$$1\frac{1}{2}$ per pound, will it take to pay for 20 bushels of potatoes, at 90 cents a bushel?
   If 1 horse eats $20\frac{1}{2}$ tons of hay in 3 winters, how many horses are required to consume 738 tons in the same time?

LESSON XCI.

1. $\frac{4}{7} + 13 - (6\frac{7}{8} - \frac{3}{8}) + \frac{4}{5}$ = ? $\frac{6}{7} + 14\frac{3}{5} - (12\frac{2}{5} - 1\frac{3}{4})$ = ?
2. $573\frac{6}{11} \div \frac{5}{8}$ = ? $3\frac{1}{6} + 4\frac{3}{4} \div \frac{5}{8}$ = ?

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3. If $18\frac{4}{5}$ yards of cloth are worth $\$43\frac{1}{11}\frac{3}{5}$, what are $23\frac{1}{2}$ yards worth?
4. What are the prime factors of 26840? Reduce $\frac{3}{5}\frac{4}{0}\frac{7}{0}\frac{1}{5}$ to its lowest terms.
5. A purchased a house for $6500, which was $2\frac{3}{5}$ times as much as B paid for his. How much more did A's cost than B's?

LESSON XCII.

1. $6\frac{3}{5}+4\frac{1}{1}\frac{7}{2}\div\frac{6}{14}=?$ $437\frac{4}{7}\div 6\frac{6}{15}=?$
2. $\frac{\frac{1}{5}}{\frac{5}{6}}+\frac{4\frac{1}{5}}{12\frac{1}{3}}=?$ $\frac{4\frac{2}{3}\times 6\frac{3}{5}}{12\frac{5}{8}-3\frac{1}{5}}=?$
3. If the aggregate weight of 14 barrels of sugar is $1790\frac{3}{7}$ pounds, what is their average weight?
4. A man owning a factory sold $\frac{2}{5}$ of it for $6940; what was the value of the factory?
5. A store is valued at $33600, which is $2\frac{5}{8}$ times the value of its contents; what is the value of its contents?

LESSON XCIII.

1. $8\frac{3}{7}+11-(3-2)+\frac{5}{7}=?$ $(14+\frac{3}{5}+\frac{5}{7}-\frac{3}{4})-4\frac{1}{7}=?$
2. $493\frac{1}{11}\div 4\frac{3}{8}=?$ $437\frac{3}{5}\div 2\frac{1}{7}=?$
3. If $37\frac{1}{4}$ tons of leather cost $\$1565\frac{1}{4}$, what will 100 tons cost?
4. If $4\frac{5}{8}$ dozen eggs cost $87\frac{1}{2}$ cents, what will 12 dozen cost?
5. A store is valued at $10000.10, which is $1\frac{3}{4}$ times the value of the merchandise within it. What is the merchandise worth?

LESSON XCIV.

1. $\frac{5}{8}+\frac{3}{7}-\frac{5}{8}-\frac{2}{7}+\frac{4}{5}=?$ $4+\frac{3}{8}+6\frac{3}{4}-(\frac{3}{4}+\frac{5}{7})=?$
2. $837\frac{1}{7}\div 3\frac{4}{5}=?$ $437\frac{4}{7}\div 6\frac{6}{15}=?$
3. If 8 men can dig a ditch in $480\frac{8}{15}$ days, how long will it take 13 men to dig the same ditch?
4. If $141\frac{1}{2}$ yards of cloth make $29\frac{1}{15}$ suits, how many yards are required in each suit?
5. If 124 dollars will pay for $165\frac{1}{3}$ yards of cloth, what will $10\frac{1}{2}$ yards cost at the same rate?

LESSON XCV.

1. $\frac{6}{7}$ of 147 is $\frac{3}{11}$ of what numbers?
   $\frac{5}{6}$ of 126 is $\frac{5}{19}$ of what numbers?
2. $\frac{\frac{2}{7}+\frac{1}{14}}{4+2}=?$ $\frac{1\frac{5}{18}-1\frac{1}{24}}{1\frac{5}{36}}=?$

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3. If a boat sails at the rate of $243\frac{11}{30}$ miles in $19\frac{3}{5}$ hours, what is the rate an hour?
4. If a man makes $\frac{17}{18}$ dollars on every chair he sells, how many must he sell to make $19\frac{5}{6}$ dollars?
5. If $5\frac{4}{5}$ acres yield $100\frac{49}{110}$ bushels of grain, what would be the yield of $36\frac{3}{5}$ acres?

LESSON XCVI.

1. $\frac{7\frac{3}{4}}{\frac{1}{5}}-\frac{7\frac{1}{3}}{1\frac{1}{12}}=?$ $\frac{4\frac{2}{3}+6\frac{5}{6}}{12\frac{1}{3}+8\frac{3}{4}}=?$
2. $\frac{2\frac{3}{5}}{5\frac{1}{2}}$ of 6000 is $\frac{4}{11}$ of what number?
   $\frac{4}{\frac{2}{3}}$ of 3486 is $\frac{14\frac{6}{7}}{\frac{1}{2}\frac{1}{0}}$ of what number?
3. If a locomotive runs $556\frac{1}{2}$ miles in 18 hours, how far does it go in $\frac{3}{4}$ of an hour?
4. If $\frac{1}{5}$ of a tree cast a shadow of $27\frac{3}{5}$ feet in length, how long is a shadow cast by $\frac{5}{8}$ of it?
5. A man commenced business with a capital of $\$10785\frac{7}{45}$; at the end of the year he had $\$18649\frac{3}{5}$. What were his profits?

LESSON XCVII.

1. $(11-\frac{3}{4})+\frac{5}{6}-\frac{3}{8}=?$ $\frac{5}{8}+(16\frac{3}{4}-\frac{7}{8})-\frac{3}{4}+\frac{5}{8}=?$
2. $912\frac{5}{7}\div 8\frac{4}{5}=?$ $44\frac{2}{11}+8\frac{3}{4}\div\frac{4}{5}=?$
3. $\frac{2\,7\,8\,6\,4\,9}{4\,8\,4\,9\,3}\frac{8\,7\,3\,0}{5}=?$ $9875649\frac{7}{9\,6\,7\,8}=?$
4. If 384 bushels of apples fill $153\frac{3}{5}$ bbl., how many bu. are there in a barrel?
5. If $378\frac{3}{4}$ yards of cloth cost \$1515, what will $9\frac{1}{3}$ yds. cost?

LESSON XCVIII.

1. $814\frac{1}{2}\div 40\frac{3}{4}=?$ $470\frac{3}{7}\div 85\frac{5}{9}=?$
2. $\frac{3}{8}+6\frac{4}{7}-\frac{3}{8}+\frac{5}{7}+\frac{5}{14}=?$ $\frac{3}{4}+\frac{5}{6}+\frac{5}{8}-\frac{3}{7}=?$
3. A man gave \$2200 for hogs, giving $7\frac{1}{3}$ dollars apiece. How many hogs did he buy?
4. If one lb. cost $6\frac{3}{6\frac{1}{2}}$ cents, how many pounds can be bought for $187\frac{1}{2}$ cents?
   If $584\frac{1}{2}$ bushels cost $\$657\frac{1}{2}$, what will $17\frac{1}{2}$ bushels cost, at the same rate?
5. A lady spent \$480 for furniture, and then had remaining $\frac{14}{20}$ as much money as she had at first. How much had she at first?

NOTE.—In rooms where there are two classes of the same grade, the more advanced will be prepared for the harder work which is now introduced, while the other may need a review from Lesson 29.

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LESSON XCIX.

1. $713\frac{5}{7} \div 71\frac{4}{5} = ?$ $614\frac{4}{5} \times 70\frac{1}{2} = ?$
2. $67\frac{3}{5} \times 834 = ?$ $\frac{1}{3} + \frac{6}{7} - \frac{3}{8} + \frac{7}{8} = ?$
3. $121\frac{1}{5} \div 75\frac{3}{4} = ?$
   From $9\frac{1}{10}$ times $4\frac{1}{3}$ take $\frac{1}{2}$ of $\frac{5}{8}$ of $\frac{4}{5}$ of $\frac{33}{55}$ of 10.
4. A man spent \$1680 for goods, and then had only $\frac{39}{40}$ as much money as he had at first. How much money had he at first?
5. A and B own a store. A owns $\frac{3}{7}$ of it and B $\frac{4}{7}$ of it. It is found that B owns \$190 more than A. How many dollars has each in the store?

LESSON C.

1. $549\frac{4}{11} \times 98 = ?$ $6721\frac{1}{12} \div 3\frac{1}{2} = ?$
2. $(\frac{4}{7} \times \frac{3}{4} \times \frac{14}{24}) + (\frac{3}{5} \times 2\frac{1}{3} \times \frac{1}{2}) + \frac{3}{4} = ?$ $\frac{3}{5} + 4\frac{1}{3} + 6\frac{1}{6} + 11\frac{1}{2} = ?$
3. $(13\frac{3}{4} - 1\frac{7}{8}) + \frac{6}{7} + \frac{4}{5} = ?$ $\frac{8}{7} + \frac{2}{3} + \frac{5}{6} - \frac{6}{7} + \frac{1}{11} = ?$
4. A stock dealer spent \$7000 in cattle, and then had remaining $\frac{13}{20}$ as much as he had at first. How much had he at first?
5. A man left to his two sons his property. To the younger he gave $\frac{7}{15}$ and to the older $\frac{8}{15}$ of it, which was \$1000 more than the younger received. Find the share of each.

LESSON CI.

1. $4\frac{3}{5} \times 6\frac{3}{5} - 21\frac{9}{10} = ?$ $1\frac{3}{4} \div \frac{1}{2} \div 2\frac{1}{2} \div \frac{3}{4} = ?$
2. $4\frac{4}{5} - 1\frac{2}{5} - 1\frac{2}{5} = ?$ $\frac{2}{3}$ of $\frac{3}{5}$ of $\frac{6}{7} \div \frac{2}{3} + \frac{5}{4} + \frac{9}{11} = ?$
3. 8 times $12\frac{3}{4} + 9\frac{1}{2}$ times $50\frac{1}{2} + 12\frac{3}{4}$ times $13 = ?$
4. James spent \$700.70 for toys to stock a store, and then had only $\frac{33}{50}$ as much as he had at first. How much money had he at first?
5. A man gave to his daughter $\frac{5}{11}$ of his property, and to his son $\frac{6}{11}$ of it, which was \$890 more than the daughter received. What was the share of each?

LESSON CII.

1. $\frac{8}{14} \times 9\frac{1}{3} \times 7\frac{3}{5} \times \frac{10}{16} \times 7\frac{1}{2} = ?$ $\frac{9}{28} \times 3\frac{1}{2} \times 7\frac{2}{3} \times \frac{8}{23} \times 2\frac{1}{4} = ?$
2. $19\frac{1}{2} - 10\frac{10}{11} = ?$ $5\frac{1}{2}$ times $7\frac{1}{6} - 6\frac{8}{9} = ?$
3. $7\frac{1}{6} + 3\frac{3}{10} + 5\frac{4}{10} + 3\frac{4}{5} = ?$ $5\frac{8}{9} + 2\frac{1}{20} + 8\frac{7}{30} + 11\frac{1}{12} = ?$
4. Divide $\frac{2}{7}$ of $\frac{14}{16}$ of $\frac{8}{15}$ by $\frac{7}{8}$ of $\frac{15}{14}$ of $\frac{2}{3}$.
   Divide $\frac{2}{7}$ *of* $\frac{10}{12}$ by $4\frac{1}{2} \times \frac{2}{3}$.
5. *In a tierce of* wine, 50 gallons ran out and there remained $\frac{3}{7}$

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as much as there was at first. How many gallons were there in the tierce before any leaked out?

Two boys have a box of marbles; the first boy has $\frac{3}{8}$ of them and the other $\frac{5}{8}$, also 100 marbles more. How many marbles has each?

LESSON CIII.

1. $\frac{4}{5}$ of $24+\frac{5}{7}$ of $42+\frac{2}{3}$ of $62+\frac{11}{12}$ of $15=$?
2. $15\frac{3}{4}\div 6\frac{3}{8}=$? $485\frac{5}{6}\div 9\frac{4}{5}=$?
3. $\frac{7}{8}$ of 9680 is $\frac{10}{11}$ of what number?
   $\frac{8}{11}$ of 2728 is $\frac{11}{35}$ of what number?
4. A certain number of acres was divided between two brothers. The first received 175 acres, when $\frac{13}{35}$ of the whole number were left for the second. How many acres did he receive?
5. Two men own a factory; A owns $\frac{4}{7}$ and B the remainder, which is \$1568 less than A's share. What is the value of B's interest?

LESSON CIV.

1. $\frac{3}{4}\times\frac{5}{6}\times\frac{8}{12}\times\frac{18}{30}\times\frac{3}{4}\times 1\frac{1}{2}=$? $2\frac{1}{2}\times\frac{10}{12}\times 1\frac{4}{5}\times\frac{5}{3}\times 2\frac{5}{6}\times\frac{12}{34}=$?
2. $1728\frac{5}{6}\div 406\frac{1}{2}=$? $1728\frac{5}{6}\times 406\frac{1}{2}=$?
3. $\frac{7}{13}$ of 12510 is $\frac{9}{21}$ of what number?
   $\frac{11}{12}$ of 1728 is $\frac{12}{15}$ of what number?
4. $\frac{8}{17}$ of a ship's cargo was lost at sea, which was \$1940 less in value than what remained. What was the value of the entire cargo?
5. For property destroyed by fire, a merchant received \$3520, when he found it was $\frac{2}{13}$ less than the entire value. What was the entire value?

LESSON CV.

1. $16\frac{1}{6}$ is $\frac{12}{20}$ of what number?
   Reduce $\frac{10}{100}\frac{2}{65}\frac{12}{5}$ to its lowest terms.
2. $(\frac{4}{5}\frac{5}{3}-1\frac{5}{6})+(3\frac{1}{3}\times\frac{9}{10})+(3\frac{4}{5}\times\frac{20}{38})=$?
3. Divide $7\frac{1}{2}\times 7\frac{1}{15}$ by $\frac{1}{2}$ of $3\frac{1}{3}$.
   If $5\frac{1}{2}$ barrels of flour cost $\$48\frac{3}{4}$, how many barrels can be bought for $\$263\frac{1}{4}$?
4. A man gave 150 acres to his son, and then had remaining $\frac{2}{5}$ as much as he had at first. What is the value of the remainder at $\$47\frac{1}{2}$ per acre?
5. A man left $\frac{13}{17}$ of his property to his son, and the remainder, which was \$4000, to a church. What was the amount of his estate?

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LESSON CVI.

1. Find the difference between $9\frac{1}{3}$ times $11\frac{1}{4}$ and $12\frac{6}{11}$ times $13\frac{3}{14}$.
2. $19\frac{4}{15} - 7\frac{7}{11} \div \frac{5}{9} = ?$ Reduce $\frac{3}{3}\frac{8}{8}\frac{8}{4}$ to its lowest terms.
3. $2\frac{1}{3} \times 1\frac{1}{14} \times \frac{2}{3} \times \frac{18}{32} \times \frac{8}{9} \times 2\frac{1}{11} \times 3\frac{1}{3} = ?$
   $8\frac{1}{3} \times \frac{18}{35} \times \frac{14}{15} \times \frac{7}{8} \times 4\frac{1}{10} \times \frac{10}{17} \times \frac{8}{9} = ?$
4. A dairyman bought milk to manufacture into butter and cheese; he used 960 gallons for cheese, then had remaining only $\frac{10}{18}$ as much as he had at first. How many gallons had he, and how many did he use for butter?
5. A and B dissolve partnership. A takes $\frac{3}{5}$ of the stock, which is $960.60 more than B. What is each one's stock worth?

LESSON CVII.

1. $\frac{3}{5}$ of $\frac{5}{6}$ of $\frac{3}{10}$ of $\frac{3}{4}$ times $10\frac{1}{2}$ divided by $10 = ?$
2. Find the difference between $18\frac{3}{4}$ times $275\frac{1}{3}$ and $25\frac{3}{5}$ times $200\frac{5}{8}$.
3. $\frac{9}{21}$ of 14608 is $\frac{7}{16}$ of what number?
   $3 \times \frac{4}{5} \times \frac{10}{14} \times \frac{21}{36} \times \frac{6}{7} \times \frac{8}{12} \times 1\frac{9}{10} = ?$
4. An estate was left to be divided as follows: A was to receive $6400, when the remainder, which was B's share, was only $\frac{9}{41}$ of the whole. What was B's share?
5. Of two city lots, one is valued at $500 less than the other, which is $\frac{7}{8}$ of its value. What is the value of each?

LESSON CVIII.

1. $9\frac{1}{6} - 7\frac{19}{11} = ?$ $4\frac{1}{2}$ times $7\frac{1}{6} - 5\frac{3}{5} = ?$
2. Divide $\frac{2}{3}$ of $\frac{1}{16}$ of $\frac{8}{12}$ by $\frac{7}{8}$ of $\frac{10}{14}$ of $\frac{3}{5}$.
3. $16\frac{1}{2}$ is $1\frac{9}{20}$ of what number?
   $\frac{4}{7}$ of $\frac{5}{6}$ is $\frac{5}{14}$ of $\frac{1}{3}$ of what number?
4. Out of a flock of sheep 125 remained after selling $\frac{3}{6}\frac{8}{5}$ of it. What was the original number?
5. An estate consisted of three houses and lots. The value of the first was $\frac{2}{7}$, and the second $\frac{3}{5}$ of the value of the estate, and the third was valued at $4840. What was the value of the first and second pieces of property?

LESSON CIX.

1. $\frac{1}{3}$ of $\frac{3}{5}$ of 96 is $\frac{3}{5}$ of what number?
   $\frac{7}{16}$ of $\frac{4}{21}$ of $\frac{3}{5}$ of 126 is $\frac{7}{35}$ of what number?
2. Find the least common denominator of $1\frac{1}{3}$, $\frac{7}{16}$, $\frac{5}{24}$, $\frac{37}{60}$, $1\frac{5}{12}$, $\frac{3}{8}$.
3. *Reduce $\frac{7}{8}$ to a* fraction whose denominator is 1728.

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Reduce $\frac{18}{19}$ to a fraction whose denominator is 50.000.

4. A sum of money is divided among A, B and C. A has $\frac{1}{2}$, B $\frac{1}{4}$, and C the remainder, which is $480. What was the amount divided?

5. Bought groceries for $375\frac{81}{104}$ and sold them for $584\frac{8}{13}$. What was the gain?

From a cistern containing $387\frac{9}{14}$ gallons, $118\frac{7}{13}$ leaked out. How many gallons remained in?

LESSON CX.

1. $\frac{3}{5}$ of $\frac{14}{21}$ of $\frac{7}{8}$ of 4710 is $\frac{11}{17}$ of what number? $210\frac{3}{8} \div 17 = ?$
2. $\frac{2}{3}$ of $\frac{3}{11}$ of 15422 is $\frac{2}{15}$ of what number? $(\frac{3}{7}$ of $\frac{28}{183}) - (\frac{1}{10}$ of $\frac{40}{183}) = ?$
3. Divide $\frac{2}{3}$ of $\frac{12}{13}$ by $4\frac{1}{2}$ times $\frac{2}{3}$.
Reduce $\frac{12}{100}\frac{12}{100}$ to its lowest terms.
4. A farmer has his sheep in three fields. In the first $\frac{1}{3}$ of his flock, in the second $\frac{1}{5}$, and the remainder, numbering 480, in the third. How many sheep has he?
5. 4 men bought a farm. A paid $\$785\frac{1}{4}$, B $\$387\frac{1}{4}$, C as much as A and B, D as much as the other three. What was the cost of the farm?

LESSON CXI.

1. $\frac{1}{3}$ of $\frac{12}{21}$ of $\frac{6}{35}$ of 540 is $\frac{4}{7}$ of $\frac{2}{3}$ of what number?
2. $7\frac{1}{2} + 4\frac{3}{4} + 6\frac{7}{10} + 5 + 19\frac{1}{15} = ?$
1200 is $\frac{200}{888}$ of what number?
3. A has $\frac{4}{5}$ of $23. B has $\frac{5}{8}$ of $62. C has $\frac{9}{13}$ of $520. How many dollars have they?
4. If 10 barrels of flour cost $97\frac{1}{2}$, what will be the cost of 125 barrels?
5. A certain number of bushels of grain were raised upon a farm, $\frac{1}{4}$ of which was wheat, $\frac{2}{5}$ oats, $\frac{3}{20}$ barley, and the remainder, which was 600 bushels, corn. How many bu. in all?

LESSON CXII.

1. $8964 \times 976\frac{4}{7} = ?$ $600400 \div 415\frac{3}{4} = ?$
2. $11\frac{3}{5} + 5\frac{1}{30} - 16\frac{1}{3} = ?$
From $9\frac{1}{20}$ take $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{1}{8}$ of $4\frac{1}{2}$.
3. A merchant cut from a piece of cloth, containing $150\frac{7}{15}$ yds., $134\frac{5}{14}$ yds. at four different times. How many yards remained?
4. A man's house-rent is $\$875\frac{8}{10}$ per annum, rent of store $\$5488\frac{87}{100}$, and household expenses $\$3785\frac{1}{4}$. What must

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his profit be to cover his entire expenses and have remaining $2785\frac{5}{11}$?

5. A man left $\frac{1}{3}$ of his estate to his wife, $\frac{1}{4}$ to each of two sons, and the remainder, which was $18000, to his daughter. What was the portion of each, and what was the amount of the entire estate?

LESSON CXIII.

1. $(2\frac{1}{2} \times \frac{3}{10}) + (3\frac{1}{3} \times \frac{7}{8} \times \frac{4}{15} \times 3\frac{1}{4}) + \frac{1}{4} = ?$
2. A has $4\frac{1}{4}$ times $9\frac{3}{7}$; B has $2\frac{1}{7}$ times $5\frac{1}{3}$. How much more has A than B?
3. What is the cost of $18\frac{1}{4}$ yds. of cloth, at $2\frac{3}{5}$ per yd., and $10\frac{5}{8}$ yards, at $3\frac{1}{4}$ per yard?
4. If $\frac{3}{11}$ of a yard of velvet costs $5, how much can be bought for $52.50?
6. A man after giving $\frac{1}{6}$, $\frac{1}{3}$ and $\frac{1}{7}$ of his money for charity, had $17000 left. How much had he first?

LESSON CXIV.

1. $4987 \times 358\frac{14}{15} = ?$ $\quad 900\frac{1}{17} - 888\frac{4}{15} = ?$
2. $600400 \div 415\frac{3}{4} = ?$ $\quad 784\frac{1}{15} - 783\frac{5}{11} = ?$
3. What is the cost of $6\frac{3}{5}$ yds. of cassimere, at $4\frac{1}{2}$ per yd., and $3\frac{1}{2}$ barrels of flour at $7\frac{3}{4}$ per barrel?
4. $\frac{3}{5} \times \frac{12}{17} \times \frac{14}{24} \times \frac{18}{30} \times \frac{3}{4} \times 1\frac{1}{2} = ?$ $\quad 2\frac{1}{3} \times \frac{3}{21} \times 1\frac{1}{3} \times \frac{3}{5} \times 2\frac{5}{8} \times \frac{16}{24} = ?$
5. A man gave $\frac{1}{4}$ of his money to his wife, $\frac{1}{3}$ to his son, $\frac{1}{5}$ to his daughter, and the remainder, which was $13000, for the founding of a hospital. What was the amount of his fortune?

LESSON CXV.

1. $49006\frac{11}{15} \times 986 = ?$ $\quad 1000\frac{1}{11} - 999\frac{7}{13} = ?$
2. $906407 \div 125\frac{3}{7} = ?$ $\quad 589\frac{3}{13} - 588\frac{3}{14} = ?$
3. $\frac{1}{2}$ of $\frac{3}{4}$ of $\frac{5}{8}$ of $\frac{1}{3}$ of $\frac{5}{6}$ of $\frac{6}{7}$ of $\frac{7}{8}$ of $\frac{8}{9} = ?$
   $\frac{5}{6}$ of $\frac{12}{30}$ of $\frac{15}{16}$ of $\frac{14}{15}$ of $4\frac{10}{21}$ of $\frac{35}{45} = ?$
4. A farmer sold $121\frac{1}{2}$ bushels of wheat, at $2\frac{1}{2}$ per bushel, and invested the money in oats, at $\frac{7}{15}$ per bushel. How many bushels did he buy?
5. Three men buy a store and contents; A buys $\frac{2}{5}$ of it, B $\frac{2}{7}$, and C the remainder, which is $31000. What are the sums paid by A and B?

LESSON CXVI.

1. $69704 \times 897\frac{13}{21} = ?$ $\quad 496\frac{13}{14} - 495\frac{6}{14} = ?$
2. $69704 \div 897\frac{13}{21} = ?$ $\quad 400\frac{11}{15} - 399\frac{8}{14} = ?$

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3. If a man earn $\$5\frac{9}{11}$ in a day, how much can 15 men earn in 30 days?

If a man buys wheat at \$1.50 per bushel, and sells it at \$1.70 per bushel, how much can he make on $175\frac{3}{4}$ bushels?

4. A man spent $\frac{3}{5}$ of his money and lost $\frac{5}{21}$, then had \$1938. How much money had he at first?

5. If 8 be added to both terms of the fraction $\frac{4}{7}$, will it be increased or diminished, and how much?

LESSON CXVII.

1. $(4\frac{1}{3} \times \frac{7}{10}) + (3\frac{1}{3} \times \frac{7}{8} \times \frac{6}{17} \times 4\frac{1}{4}) + \frac{1}{2} = ?$
2. $76 - 35\frac{3}{4} - 17\frac{1}{4} = ?$ $14\frac{1}{4} + 17\frac{5}{8} + 30\frac{3}{4} = ?$
3. A man had $478\frac{3}{5}$ acres of land. He sold $95\frac{1}{4}$ acres at one time and $126\frac{1}{10}$ at another. How many acres had he left?
4. The contents of a store destroyed by fire was valued at $\$187316\frac{11}{144}$. It was insured in two companies for $\$46835\frac{9}{24}$ and $\$78642\frac{3}{12}$. What was the loss?
5. A merchant invested $\frac{1}{3}$ of his money in dry-goods, $\frac{1}{4}$ in groceries, $\frac{3}{8}$ in a miscellaneous stock, and the remainder, which was \$960, in repairing his store. How much money had he at first?

LESSON CXVIII.

1. $18\frac{3}{4} - 7\frac{7}{8} - 4\frac{1}{12} = ?$ $\frac{9}{10} + \frac{3}{4} + \frac{4}{5} + 7\frac{19}{20} = ?$
2. How much more is $\frac{17}{60}$ of 649 than $\frac{31}{100}$ of 99?
3. If 18 persons use $2\frac{4}{5}$ lbs. of tea in a month, how much will 16 persons use in a year?
4. The sum of two numbers is $2785\frac{9}{132}$, and the greater is $1942\frac{17}{33}$. What is the less number?
5. A man gave $\frac{1}{4}$ of his property to his wife, $\frac{1}{5}$ to his elder son, $\frac{3}{10}$ to his younger son, and the remainder, which was \$25000, was divided between his two daughters. What was the value of his estate, and what was each one's portion?

LESSON CXIX.

1. $8\frac{1}{2} \times 91\frac{7}{10} \times 55\frac{4}{8} = ?$ $46\frac{1}{21} - 23\frac{1}{21} - 4\frac{1}{7} - 3\frac{1}{2} = ?$
2. $46\frac{4}{5} \times 25\frac{15}{100} - 19\frac{2}{3} = ?$ $19\frac{3}{4} - 2\frac{8}{11} - 7\frac{3}{20} - 4\frac{19}{20} = ?$
3. I sold $15\frac{1}{8}$ bushels of apples for \$14.56. What should I receive for $39\frac{4}{7}$ bushels at the same rate?

A man having \$20000, spent $\frac{3}{4}$ of it; the remainder he put in a bank where it remained 20 yrs. He then had to his credit double the amount invested. How much had he *in bank?*

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4. If a ship sail $150\frac{3}{8}$ miles a day, how far will she sail in $20\frac{1}{3}$ days?

If $5\frac{1}{6}$ yards make a suit of clothes, how many suits will 124 yds. make?

5. A man bought cows at $\$40\frac{1}{2}$ each; if he had paid $\$45\frac{3}{4}$ each they would have cost him \$399 more. How many cows did he buy?

LESSON CXX.

1. $(6\times\frac{1}{3}\times\frac{2}{5}\times4\frac{4}{5})-(3\frac{1}{3}\times\frac{2}{5}\times4\times\frac{3}{5})=?$

The difference between $\frac{2}{3}$ of $6\frac{7}{10}$ and $\frac{5}{9}$ of $4\frac{8}{15}=?$

2. $8460\frac{1}{7}\frac{3}{7}\times864=?$ $946\frac{1}{12}\frac{3}{12}-945\frac{1}{16}\frac{1}{16}=?$

3. At $\$8\frac{1}{2}$ per barrel, how much flour can be bought for $\$7\frac{1}{2}$?

If one barrel of flour costs $\$6\frac{1}{6}$, how much can be bought for $\$3\frac{1}{3}$?

4. The difference between $\frac{1}{7}$ and $\frac{1}{8}$ of a number is 987; what is the number?

5. A man sold horses at $\$175\frac{1}{2}$ each; if he had received $\$180\frac{1}{4}$ each he would have received \$1050 more. How many horses did he sell?

LESSON CXXI.

1. $4268\times384\frac{1}{16}\frac{1}{16}=?$ $4854\frac{1}{18}\frac{3}{18}-2851\frac{1}{20}\frac{9}{20}=?$

2. $\frac{8}{7}\frac{8}{7}\times\frac{15}{32}\times\frac{36}{50}\times\frac{30}{32}\times20\div\frac{48}{11}\frac{5}{11}\times\frac{34}{35}\times\frac{50}{80}\times\frac{28}{50}=?$

3. If I can do a piece of work in 8 days, how much of it can I do in $3\frac{1}{3}$ days?

If a ship sail $\frac{7}{11}$ of a mile in an hour, how far will she sail in $\frac{11}{44}$ of an hour?

4. A man owning $\frac{3}{8}$ of a factory, sells $\frac{5}{9}$ of his share for \$4690. What is the value of the factory?

5. A speculator bought calves at $\$4\frac{1}{2}$ each, and sold them at $\$4\frac{3}{4}$ each; he gained \$110. How many calves were there?

LESSON CXXII.

1. $9864\times385\frac{5}{17}\frac{5}{17}=?$ $9208\frac{3}{18}\frac{3}{18}-9207\frac{8}{14}\frac{8}{14}=?$

2. $37\frac{1}{2}-19\frac{1}{4}-6\frac{1}{2}\frac{1}{5}-8\frac{1}{10}\frac{3}{10}=?$ $\frac{\frac{3}{4}\text{ of }2\frac{1}{3}}{\frac{9}{10}}\div\frac{\frac{2}{3}\text{ of }1\frac{1}{2}}{\frac{1}{18}\text{ of }5\frac{1}{2}}=?$

3. $\frac{21}{40}\times\frac{35}{48}\times16\times20\times\frac{1}{4}\div12\times\frac{15}{24}\times6\frac{1}{2}\times\frac{18}{30}\times\frac{42}{1}\times\frac{1}{4}=?$

4. Reduce to equivalent fractions having 75 for a denominator, $\frac{17}{25}$, $\frac{15}{16}$, 75, $14\frac{4}{5}$.

5. A boy bought geese at $\$\frac{7}{8}$ each, and sold at $\$1\frac{1}{4}$ each; he gained \$300. How many geese were there?

At the rate of $17\frac{1}{2}$ miles an hour, how long will it take a *train of cars to* run a distance of $3613\frac{3}{4}$ miles?

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LESSON CXXIII.

1. $6\frac{7}{8}+1\frac{1}{12}+\frac{3}{4}-7\frac{1}{8}=?$ $30\frac{4}{5}+27\frac{3}{10}+15\frac{1}{8}+20+1\frac{3}{11}=?$
2. $263\frac{1}{4}\div(48\frac{3}{4}\div5)=?$ $760076\div907\frac{5}{8}=?$
3. $9\frac{3}{8}\div31\frac{1}{2}\times10\frac{1}{4}=?$ $6\frac{3}{4}\times5+\frac{7}{8}-4\frac{5}{7}=?$
4. In a library $\frac{1}{4}$ of the volumes were historical, $\frac{1}{3}$ were scientific, $\frac{3}{10}$ poetical, and the remaining 200 volumes were works of fiction. How many volumes did the library contain?
5. A man left an estate of $\$48750\frac{3}{4}$ to be divided equally between two sons, after deducting $\frac{1}{4}$ for the payment of debts. What was the portion of each?

LESSON CXXIV.

1. $(\frac{3}{5}$ of $17)+(\frac{5}{8}$ of $375)+(\frac{1}{2}$ of $7862)+(\frac{1}{3}$ of $\frac{3}{8}$ of $\frac{3}{4}$ of $16)=?$
2. $63\frac{1}{3}\div8\frac{1}{3}\div6\frac{1}{12}=?$ Reduce to its lowest terms $\frac{2520}{1260}$.
3. $(42\frac{1}{2}\times48\frac{4}{7}\times21\frac{1}{2})-(42\frac{1}{2}\times97\frac{3}{4})=?$
4. In a certain city $\frac{2}{5}$ of the inhabitants are Americans, $\frac{1}{3}$ French, $\frac{4}{17}$ Germans, and the remainder, which is 2000, Irish. What is the entire population?
5. On the first of January a speculator deposited in bank $\$175480\frac{7}{15}$. He drew out at different times $\$46872\frac{2}{3}\frac{2}{0}$, $\$27598\frac{4}{5}$ and $\$11387\frac{3}{10}$. What amount had he then to his credit?

LESSON CXXV.

1. $12\frac{4}{5}\times85\frac{14}{25}-799\frac{15}{17}=?$ Reduce to its lowest terms $\frac{1056}{1152}$.
2. $4\times\frac{8}{14}\times9\frac{1}{2}\times7\frac{3}{4}\times\frac{20}{35}\times7\frac{1}{2}\times\frac{1}{4}=?$
   $7\times\frac{9}{28}\times3\frac{1}{2}\times7\frac{5}{8}\times\frac{9}{25}\times2\frac{1}{4}=?$
3. From $7\frac{1}{2}$ times $3\frac{1}{3}$ take $7\frac{10}{11}$. From $28\frac{1}{3}$ take $9\frac{5}{8}$.
4. If ten barrels of flour cost $\$97\frac{1}{2}$, how many barrels can be bought for $\$263\frac{1}{4}$?
   A man owned $\frac{4}{5}$ of a mill, and sold $\frac{1}{3}$ of his share for $4000.40. What was the value of the mill?
5. A dealer in stock bought sheep at $\$2\frac{1}{2}$ per head, and sold them at $3\frac{1}{4}$ per head; he gained $1908. How many sheep did he buy?

LESSON CXXVI.

1. Divide $\frac{2}{3}$ of $\frac{7}{8}$ of $1\frac{6}{7}$ of $\frac{14}{16}$ by $\frac{7}{8}$ of $\frac{16}{14}$ of $\frac{1}{6}$.
   Divide $\frac{5}{8}$ of $\frac{20}{24}$ of $\frac{3}{15}$ by $4\frac{1}{2}\times\frac{4}{5}\times\frac{1}{3}$.
2. $476\frac{5}{25}\times928=?$ $9487\frac{7}{2687}=?$
3. If a man travel $\frac{8}{11}$ of a mile in an hour, how far can he travel *in* $\frac{4}{11}$ *of an* hour?

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If $\$6\frac{2}{3}$ will pay for one barrel of flour, how much can be bought for $\$3\frac{1}{3}$?

4. If $\frac{2}{3}$ of $\frac{3}{8}$ of a dollar will buy one bushel of corn, how much can be bought for $\frac{7}{8}$ of $\frac{10}{11}$ of \$16?

What is the quotient of $\frac{3\frac{1}{2}}{2\frac{1}{4}}$ divided by $\frac{6}{4\frac{1}{2}}$?

5. What is the product of $3\frac{1}{4} \times 9$ multiplied by ($4\frac{2}{3}$ divided by $\frac{1}{2}$ of $\frac{5}{6}$ of 8)?

LESSON CXXVII.

1. $(8\frac{1}{2}+3\frac{5}{8}+6\frac{3}{10}+4\frac{1}{5})-9\frac{7}{8}=?$ $\frac{4\,7\,8\,3\,6\,0\,2}{5\,9\,4\,8}=?$
2. $(6\frac{2}{5}+2\frac{1}{3\,0}+8\frac{7}{3\,0}+1\frac{1}{1\,2})\div 45\frac{1\,3}{8\,8}=?$
3. A grocer having $487\frac{1}{3}$ gallons of oil, sold at one time $67\frac{1}{12}$ gallons, and at another $144\frac{5}{9}$ gallons. How many gallons did he sell, and how many had he left?
4. A man sold his farm and invested the money in city lots. For the first he paid $\frac{2}{7}$ of his money, for the second $\frac{1}{4}$, for the third $\frac{3}{14}$, and for the fourth the remainder, which was \$1400. What was the entire value, and what was the value of each lot?
5. Five persons share an estate. A has $\frac{1}{4}$ of it, B $\frac{1}{6}$, C $\frac{3}{20}$, D $\frac{3}{10}$, and E the remainder, which is \$6000. What is the portion of each, and what is the entire value?

LESSON CXXVIII.

1. From $6\frac{1}{2}$ times $7\frac{1}{5}$, take $3\frac{1}{4}$ times $8\frac{1}{10}$.
2. $163\frac{1}{5}-83\frac{1}{8}-60\frac{1}{13}=?$ $\frac{1\,7\,0\,0\,7}{3\,3}=?$
3. Divide the product of $24\frac{3}{16}$ and $18\frac{3}{8}$ by the difference between $19\frac{3}{4}$ and $2\frac{1}{3}$.
4. A man put $764\frac{1}{2}$ bushels of wheat into one bin, $1408\frac{7}{8}$ into another, and $9576\frac{1\,0}{1\,8}$ into another. He sold $\frac{1}{2}$ of it at $63\frac{3}{5}$ cents a bu. How many bushels did he sell, and what did he receive for it.
5. In an orchard $\frac{1}{4}$ were apple trees, $\frac{1}{6}$ cherry trees, $\frac{3}{10}$ plum trees, and the remainder, which was 60, peach trees. How many of each kind, and how many in the orchard?

LESSON CXXIX.

1. $(\frac{3}{4}+\frac{3}{8}+\frac{1}{2}+\frac{2}{3})-(\frac{1}{6}$ of $\frac{6}{8}+\frac{2}{3}$ of $\frac{1}{2}$ and $\frac{7}{12})=?$
   $(16\frac{3}{11}-5\frac{4}{7})-(12\frac{3}{7}-9\frac{1}{2})=?$
2. $1728\frac{3}{1\,5} \times 437=?$
   In $986\frac{4}{5\,5}$ pounds how many 96ths pounds?
3. *If* $\$9\frac{3}{5}$ are paid for $31\frac{1}{2}$ gallons of oil, what are $5\frac{1}{4}$ gal. worth?

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If $\frac{4}{5}$ of a vessel cost \$1500, what will 15 such vessels cost?

4. A man owning $\frac{4}{5}$ of a certain stock sells $\frac{1}{2}$ of his share for \$10000. What is the value of the stock?

5. A man willed $\frac{1}{3}$ of his property to his wife, $\frac{1}{2}$ of remainder to his daughter, and the remainder, which was \$906.30, to a church. What was the amount of his property?

LESSON CXXX.

1. $98765\frac{8}{9} \times 908 = ?$ $\frac{98765 \times 8840}{4 \times 6 \times 8} = ?$
2. $8964 \div 876\frac{4}{7} = ?$ $897654\frac{7}{9 \times 8} = ?$
3. How much more is $\frac{17}{20}$ of 649 than $\frac{21}{100}$ of 99?
4. A man owning $\frac{3}{4}$ of a section of land sold $\frac{2}{3}$ of his share for \$9900.90. What is the value of the section?
5. A man willed $\frac{1}{3}$ of his property to his wife, $\frac{3}{4}$ of remainder to his son, and the remainder, which was \$600.60, to a benevolent society. What was the amount of his property?

LESSON CXXXI.

1. $(9\frac{3}{4} \times 35\frac{1}{2}) + (7\frac{1}{2} \times 212\frac{3}{4}) = ?$
2. What is the product of the G. C. D. of 144, 252, 288, 432, and of the least common multiple of 18, 24, 36, 30, 84?
3. $27\frac{7}{8} - 17\frac{1}{4} - \frac{1}{2} - 16\frac{1}{16} = ?$ $\frac{1}{11}$ of $\frac{8}{9}$ of $\frac{11}{7} \times 2\frac{3}{4} = ?$
4. What number is $6\frac{2}{3}$ times the difference between $187\frac{1}{3}$ and $96\frac{2}{3}$?
5. Mary gave $\frac{1}{3}$ of her money to her father, $\frac{1}{5}$ of the remainder to her mother, $\frac{2}{3}$ of what then remained to her brother, and then had left \$500.50. What amount had she at first?

LESSON CXXXII.

1. $(735\frac{3}{4} \div 81\frac{3}{4}) \times (\frac{7}{8} \times \frac{9}{10}$ of $20 \div 25\frac{1}{2}) = ?$
2. $(250\frac{3}{5} \div 13\frac{23}{125}) \times \frac{1}{2} \times \frac{4}{5} \times \frac{3}{4} = ?$
3. $327\frac{1}{6} \div 16\frac{1}{2} = ?$ $497\frac{3}{8} - 100\frac{5}{16} - 297\frac{1}{8} - 100 = ?$
4. How many times is $6\frac{2}{3}$ contained in the product of $187\frac{1}{3}$ and $96\frac{2}{3}$?
5. A man gave $\frac{1}{3}$ of his money to his wife, $\frac{1}{5}$ of the remainder to his daughter, and $\frac{1}{2}$ of what then remained to his son, when he had \$5000.05 left. How much had he at first?

LESSON CXXXIII.

1. From $84\frac{3}{5}$ take $59\frac{7}{8}$. From $126\frac{1}{2}$ take $13\frac{1}{4}$ times $1\frac{1}{8}$.
2. $428 \times 8796\frac{1}{3} = ?$ $49 + 1\frac{13}{18} + 6\frac{2}{3} + 54 = ?$
3. *A man has* $\frac{4}{5}$ *of* $\frac{5}{6}$ *of* $7\frac{1}{2}$ times \$3931, and gave it for oats, at

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$\frac{1}{2}$ of $\frac{1}{2}$ of a dollar a bushel. How many bushels did he buy?

If $\frac{11}{13}$ of a ship is worth \$66550, what is the ship worth?

4. A man bought corn at the rate of $\$\frac{3}{5}$ a bushel, and sold at $\$1\frac{1}{8}$ a bushel. How much did he make on $122\frac{1}{3}$ bushels?

If $\$8\frac{2}{5}$ will buy 12 lbs. of tea, what will be the cost of 20 lbs.?

5. A man willed $\frac{1}{3}$ of his estate to his wife, $\frac{1}{4}$ of the remainder to his son, $\frac{1}{5}$ of the remainder, which was \$12000, to his daughter. What then remained?

LESSON CXXXIV.

1. $980063 \div 500\frac{1}{20} = ?$ $1000\frac{3}{13} - 999\frac{12}{14} = ?$
2. $70625 \times 800\frac{4}{20} = ?$ $264\frac{1}{14} - 263\frac{12}{13} = ?$
3. The difference between $\frac{5}{8}$ and $\frac{3}{7}$ of a number is 2432. What is the number?

If $\frac{7}{11}$ of a yard of cloth cost \$6, how much can be bought for \$660?

4. A man has $\frac{4}{5}$ of $\frac{5}{6}$ of $7\frac{1}{2}$ times \$3862 and pays it for a farm. If the farm contains 350 acres, what is the cost per acre?
5. A man willed $\frac{1}{3}$ of his estate to his wife, $\frac{1}{4}$ of the remainder to his son, $\frac{1}{5}$ of the remainder, which was $\$756.66\frac{2}{3}$, to his daughter. What then remained of his estate?

LESSON CXXXV.

1. $4987 \times 358\frac{14}{15} = ?$ $42\frac{3}{5} - 2\frac{1}{6} - 3\frac{1}{10} - 2 - 4\frac{2}{15} = ?$
2. $176\frac{9}{20} + (132\frac{7}{8} - 126\frac{9}{40}) - 17\frac{1}{2} = ?$

$\frac{3\frac{2}{5}}{4\frac{2}{3}}$ of $\frac{3\frac{2}{5}}{\frac{8}{7}} = ?$

3. If $\frac{3}{4}$ of a yard cost $\$\frac{5}{6}$, what is the cost of $\frac{11}{12}$ of a yard?

If $2\frac{7}{8}$ yards cost $\$4\frac{7}{8}$, how many yards can be bought for \$18.20?

4. If 12 men spend \$144 in 17 weeks, what will 34 men spend in 36 weeks?

If $\frac{1}{5}$ of a ship are worth \$141.52, what are $\frac{5}{8\,8}$ of it worth?

5. A man gave $\frac{1}{2}$ of his estate to his wife, $\frac{1}{3}$ of the remainder to his daughter, $\frac{1}{4}$ of the remainder to his son, and the remainder, which was \$4000.04, to the poor. What was his estate, and shares of wife, son and daughter?

LESSON CXXXVI.

1. $48\frac{1}{20} - 13\frac{2}{50} - 10\frac{99}{100} - 3\frac{999}{1000} = ?$
2. $25\frac{16}{100} \times 85\frac{7}{50} - 799\frac{15}{21} = ?$

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3. Multiply $\frac{41\frac{1}{3}}{8\frac{2}{3}}$ by $\frac{41\frac{1}{3}}{17\frac{1}{2}}$ and divide the product by $\frac{1}{3}$ of $\frac{5}{11}$ of $\frac{7}{16}$ divided by $\frac{3}{5}$ of $\frac{2}{7}$ of $\frac{1}{2}$.
4. A man gave $\frac{2}{7}$ of his money to his wife, $\frac{3}{5}$ of the remainder to his son, and $\frac{3}{4}$ of what then remained to his daughter, who received $1500. What is the value of the property and shares of his wife and son?
5. In an elevator $\frac{2}{7}$ of $\frac{5}{8}$ of the wheat was sold for $9000. What was the entire value of the wheat in the elevator?

LESSON CXXXVII.

1. $(628\frac{7}{8} \div 7\frac{5}{16}) \times (752\frac{4}{7} \div 12\frac{1}{7}) = ?$
2. $\frac{3}{7}$ of $1\frac{4}{5}$ of $\frac{1}{3}$ of 4655 is $\frac{1}{3}$ of $\frac{7}{9}$ of what number?
3. What number is $12\frac{7}{10}$ times the difference between $375\frac{1}{2}$ and $148\frac{3}{5}$?
4. A man left $\frac{1}{4}$ of his estate to his wife, $\frac{1}{7}$ to each of three sons, and the remainder, which was $18000, to his daughter. What was the portion of each and value of the estate?
5. A dealer shipped $\frac{1}{7}$ of his cotton to New Orleans, $\frac{1}{3}$ of what remained to Boston, and $\frac{3}{4}$ of what then remained to New York, when he had 478 bales remaining. How many bales were shipped to each port, and how many had he at first?

LESSON CXXXVIII.

1. The sum of three numbers is $748\frac{13}{21}$, and two of them are $107\frac{1}{4}$ and $385\frac{3}{7}$. What is the other number?
2. The divisor is $16\frac{1}{4}$, the quotient $27\frac{3}{4}$. What is the dividend?
3. $\frac{1}{3}$ of $\frac{5}{8}$ of 378 is $\frac{3}{4}$ of $\frac{7}{12}$ of what number?
4. Of a ship owned by 4 persons, A owns $\frac{1}{3}$ of it, B $\frac{3}{7}$ of what remained, C $\frac{1}{2}$ of what then remained, and D the remainder, which was valued at $3680. What is the value of the ship, and A's, B's and C's shares?
5. $\frac{3}{5}$ of the entire amount of an estate is in city lots, $\frac{3}{8}$ in bonds and mortgages, $\frac{7}{40}$ in personal property, and the remainder in cash on hand, which was $2500. What was the value of each investment, and the value of the estate?

LESSON CXXXIX.

1. $4375\frac{1}{20}\frac{5}{8} + 45\frac{1}{3} = ?$
2. $99\frac{3}{8} - 6\frac{1}{3} - 18\frac{1}{5} - 27\frac{1}{4}\frac{1}{2} - 20 = ?$
3. If $\frac{1}{4}$ of $\frac{2}{5}$ of the cost of a building is $2000, what is the entire cost?

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The less of two numbers is $4756\frac{4}{9}$ and their difference is $128\frac{3}{4}$. What is the greater number?

4. A flour merchant had 856575 bbl. of flour. After a return of 60 days' absence, he found that $\frac{12}{25}\frac{4}{5}$ of it was sold. How many bbl. remained in stock?

5. If 7 be added to both terms of the fraction $\frac{8}{11}$, will its value be increased or diminished, and how much?

If 7 be subtracted from both terms of the fraction $\frac{8}{11}$, will its value be increased or diminished, and how much?

LESSON CXL.

1. How many times will 7 times $\frac{7}{40}$ contain $\frac{3}{4}$ of $6\frac{3}{12}$ times $\frac{1}{20}$?

2. What is the cost of $\frac{4}{15}$ of $\frac{6}{8}$ of 5 acres at $\frac{4}{5}$ of $\$14\frac{1}{2}$ per acre? If 1 yd. cost $\$9\frac{1}{2}$, how much can be bought for $\$3\frac{1}{6}$?

3. A man bought 800 horses at $\$40\frac{7}{12}$ a piece, and 625 at $\$75\frac{11}{25}$ each. For how much must he sell them to gain $\$500$?

4. A man bought $205\frac{1}{8}$ acres at $\$75.75$ an acre. He sold $\frac{1}{8}$ of it at $\$80\frac{3}{4}$ per acre, and the remainder at cost. What was his profit?

5. A man had $584\frac{1}{4}$ bu. of wheat, and sold $\frac{3}{4}$ of it at 90 cents a bushel. How many bushels were sold, and how much did he receive for it?

LESSON CXLI.

1. $(1\frac{1}{4}\frac{7}{9} \div 9\frac{3}{7}) \times (1001\frac{3}{4} \div 100\frac{1}{20}) = ?$

2. $(7 \times \frac{2}{21}$ of 3 of $\frac{5}{11} \times \frac{1}{5}) \div (3\frac{1}{6} \times 1\frac{1}{8} \times \frac{5}{7} \times \frac{1}{11} \times \frac{14}{15}) = ?$

3. The product of three numbers is $768\frac{1}{2}\frac{3}{5}$, and two of them are $9\frac{3}{5}$ and $27\frac{4}{5}$. What is the third number?

4. A grocer having a cask containing $57\frac{3}{7}$ gallons of vinegar of which $\frac{7}{15}$ leaked out, sold the remainder at $18\frac{3}{4}$ cents a gallon. What did he receive for it, and how many gallons did he sell?

5. Of a ship's cargo, valued at $\$175000$, $\frac{6}{25}$ was in tea, $\frac{7}{19}$ of the remainder in coffee, $\frac{7}{12}$ of what then remained in spices, and the remainder in drugs. What was the value of each quantity?

LESSON CXLII.

1. What is the product of $(4\frac{1}{2} + 3\frac{3}{4} + 3\frac{7}{12})$ multiplied by $(2\frac{1}{2} + 1\frac{7}{45})$?

2. $7841\frac{1}{15} \div 206\frac{11}{30} = ?$ $\quad 8\frac{7}{29} \div 4\frac{7}{58} = ?$

3. The product of three numbers is $471\frac{11}{30}$, and two of them are $16\frac{1}{8}$ and $9\frac{7}{8}$; what is the third?

4. In transportation $\frac{3}{7}$ of 323 gallons of wine were wasted, and *the remainder* was sold at $3\frac{1}{2}$ dollars per gallon. What *amount* was realized from the sale?

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5. A man expended $32800 in building. He paid $\frac{3}{8}$ for brick and stone, $\frac{2}{5}$ of the remainder for woodwork, $\frac{1}{3}$ of what then remained for plastering, $\frac{3}{4}$ of what then remained for painting, and what finally remained for plumbing. Give cost of each.

LESSON CXLIII.

1. The product of three numbers is $63\frac{1}{3}$. Two of them are $8\frac{1}{3}$ and $6\frac{1}{13}$. What is the other?

2. A man gave $1600 for a horse, which was $\frac{2}{5}$ of $2\frac{2}{3}$ times as much as he paid for the carriage. What was the cost of the carriage?

A man after spending $\frac{2}{5}$ of all his money, and $\frac{2}{3}$ of the remainder, had only 134\frac{1}{2}$ left. How much had he at first?

3. $29+\frac{2}{3}\frac{6}{5}+\frac{2}{5}\frac{5}{6}+\frac{7}{8}+40+7\frac{1}{4}=?$

$(12\frac{4}{5}+16\frac{7}{8})-(5\frac{3}{4}+6\frac{2}{3})=?$

4. A man bought a farm of $106\frac{1}{2}$ acres, at $75.25 per acre. He sold $\frac{1}{3}$ of it at $70.75 per acre, and the remainder at cost. What was his loss?

5. $\frac{4}{7}\times 9\frac{1}{3}\times\frac{8}{14}\times 7\frac{3}{5}\times\frac{10}{15}\times 7\frac{1}{2}=?$

$\frac{9}{27}$ of $4\frac{1}{3}$ of $7\frac{2}{3}$ of $\frac{9}{25}$ of $2\frac{1}{4}=?$

LESSON CXLIV.

1. $7\frac{4}{5}+3\frac{7}{8}+10\frac{3}{10}+2\frac{1}{6}=?$ $2\frac{8}{9}+11\frac{1}{30}+7\frac{7}{30}+1\frac{11}{15}=?$

2. $7850.05\times 606\frac{4}{5}=?$

3. $(3\frac{2}{3}\times 6\frac{6}{11})+(4\frac{5}{7}\times\frac{2}{4}\times\frac{14}{15})+10\frac{1}{2}=?$

4. $1561.20 is $9\frac{3}{5}$ times my money. My money is $\frac{2}{10}$ of what I lost. What had I at first, and how much did I lose?

5. A owns $\frac{3}{17}$ of the money in a company, valued at $1676880. B owns $\frac{2}{5}$ of the remainder, C $\frac{2}{3}$ of what then remained, and D the remainder. How much money had each in the company?

LESSON CXLV.

1. $\frac{17\frac{17}{30}}{87\frac{5}{6}}+\frac{1\frac{17}{49}}{9\frac{3}{7}}+\frac{9\frac{3}{11}}{3\frac{1}{11}}=?$

2. $\frac{4}{21}$ of 1743 is $\frac{1}{2}\frac{8}{3}\frac{6}{7}$ of what number?

3. A farmer exchanged $47\frac{1}{2}$ bushels of potatoes at $30\frac{3}{5}$ cents a bushel, for $9\frac{1}{2}$ yards of cloth. What was the price of the cloth per yard?

4. A grocer having $35\frac{3}{7}$ gallons of syrup, loses $\frac{5}{8}$ of it, and sells the remainder at $74\frac{5}{21}$ cents a gallon. How many dollars does he receive for it?

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5. A man has 1500 sheep in 4 pastures. He has $\frac{1}{5}$ of them in the first; in the second $\frac{2}{3}$ as many as in the first; in the third $\frac{3}{5}$ as many as in the second; and the remainder in the fourth. How many in each pasture?

LESSON CXLVI.

1. $(55\frac{1}{2} \div 16\frac{1}{4}) + (46\frac{2}{3} \div 68\frac{4}{6}) = ?$
2. $1565\frac{1}{5} \div 37\frac{1}{4} = ?$ $652\frac{3}{4} \div 375\frac{1}{2} = ?$
3. I exchanged 24 cows at $\$47\frac{3}{7}$ each, and 12 horses, averaging $\$148\frac{2}{3}$ each, for flour at $\$10$ a barrel. How many barrels did I receive?
4. A dealer having $\frac{5}{8}$ of 480 bushels of apples injured by frost, sold the remainder at $\$2\frac{1}{2}$ a barrel, each barrel containing $2\frac{1}{2}$ bushels. What amount was realized from the sale?
5. A farmer has corn in 4 bins, to the amount of 2800 bushels. In the first he has $\frac{2}{7}$ of it; in the second $\frac{7}{8}$ as much as in the first; in the third $\frac{4}{5}$ as much as in the first and second; and the remainder in the fourth. How many bushels were there in each bin?

LESSON CXLVII.

1. $9008706\frac{3}{16} \times 908 = ?$
2. $9008706\frac{3}{16} \div 908 = ?$
3. A man exchanged $40\frac{4}{7}$ tubs of butter averaging $42\frac{1}{2}$ pounds, at $21\frac{1}{2}$ cents a pound, for $37\frac{1}{2}$ barrels of pork at $\$9\frac{2}{3}$ a barrel, and received the balance in cash. How much cash did he get?
4. A man having $896\frac{1}{2}$ gallons of oil, sold $\frac{3}{8}$ of it. How many gallons did he sell, and what was its value at $68\frac{1}{2}$ cents per gallon?
5. A man left his estate of $\$41550$ as follows: $\$3000$ for charity, $\frac{1}{3}$ of the remainder to his wife, and what then remained to be divided equally among his four children. What was the portion of each child?

LESSON CXLVIII.

1. $48320507\frac{1}{4}\frac{1}{5} \times 986 = ?$
2. $89679427\frac{1}{3} \div 908 = ?$
3. A stock dealer bought hogs at $\$3\frac{1}{4}$ each; if he had paid $\$4\frac{1}{4}$ each, they would have cost him $\$241.40$ more. How many hogs did he buy?
4. *The sum of two numbers is 700, and $\frac{3}{5}$ of the larger equals $\frac{1}{2}$ of the smaller.* What are the numbers?

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5. A man bought a horse, buggy and harness for $1200. The buggy costs $\frac{1}{4}$ as much as the horse, and the harness $\frac{1}{15}$ as much as the horse and buggy. What was the cost of each?

LESSON CXLIX.

1. $\frac{3}{8}$ of $33.40 + $\frac{5}{7}$ of $108.15 + $\frac{11}{13}$ of $625.24 = ?$

2. The sum of two numbers is 480, and $\frac{1}{3}$ of the larger equals $\frac{3}{4}$ of the smaller. What are the numbers?

3. A lady invested $500000 in three city lots; the first cost $\frac{1}{3}$ as much as the second, and the third $\frac{1}{4}$ as much as the first and second. What was the value of each lot?

4. A cistern has three receiving pipes; one can fill it in 11 hr., another in 8 hr., and another in 7 hr. What time will it take to fill the cistern if the three pipes are open?

5. A can dig $\frac{1}{10}$ of a ditch in one day, B $\frac{1}{15}$ of it, and C $\frac{1}{8}$ of it. How long will it take the three to dig the ditch, all working at the same time?

LESSON CL.

1. $\frac{3}{4}$ of $24.04 + $\frac{5}{8}$ of $20.20 + $\frac{3}{5}$ of $270.09 + $\frac{11}{13}$ of $625.24 + $\frac{33}{100}$ of $32000 = ?$

2. The sum of two numbers is 420, and $\frac{1}{7}$ of the larger equals $\frac{1}{4}$ of the smaller. What are the numbers?

3. A man gave $24000 to three sons. To the first he gave $\frac{1}{3}$ as much as to the second, and to the third $\frac{3}{5}$ as much as to the first and second. What was the portion given to each?

4. A reservoir has three receiving pipes; one can fill it in 5 hours, another in 7 hours, and the other in 12 hours. How long will it take to fill the reservoir if the three pipes are open?

5. Three men are working together in a hay field. A can mow $\frac{4}{15}$ of it in a day, B $\frac{1}{5}$ of it, and C $\frac{1}{8}$ of it. How long will it take them to mow the field?

PROMISCUOUS EXAMPLES.

1. What is the cost of $25\frac{1}{3}$ cwt. of sugar at $9\frac{3}{8}$ cts. a lb.?

2. A man pays $\frac{1}{3}$ of his salary for rent and fuel, $\frac{1}{7}$ for groceries, $\frac{3}{21}$ for clothing, and the remainder, which is 190 dollars, he deposits in bank. What is his salary?

3. What simple fraction is equal to $\frac{\frac{7}{8} \text{ of } \frac{5}{6} \text{ of } \frac{4}{7} \text{ of } \frac{1}{2}}{3\frac{7}{10} \times 2\frac{1}{3}} = ?$

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4. A man bought 45 horses at $75\frac{1}{2}$ each, and 497 at $88\frac{1}{4}$ each. What must be the average selling price to give an entire gain of $4210?

5. What is the cost of $87\frac{1}{2}$ yards of cloth at $7\frac{3}{10}$ cts. an inch?

6. If a man divides $\frac{1}{2}$ of an acre into 5 equal lots, and sells 3 of them, what portion of the whole acre has he left?

7. If a family consisting of 5 persons consume $3\frac{1}{2}$ barrels of flour in $11\frac{1}{2}$ months, how many barrels will 7 persons consume in $5\frac{1}{2}$ months?

8. What is the difference between $\frac{1}{11}+\frac{1}{3}+1\frac{1}{33}$, and $\frac{1}{3}$ of $\frac{3}{11}$ of $\frac{1}{3}$?

9. What number is that from which, if you take $\frac{3}{11}$ of $\frac{1}{3}$ of itself, the remainder will be $478\frac{1}{3}$?

10. If $24\frac{1}{2}$ pounds of tea cost $\$40\frac{1}{2}$, what will $6\frac{1}{4}$ pounds cost?

11. What was the cost of $\frac{1}{3}$ of $\frac{1}{4}$ of 10 acres at $\frac{1}{5}$ of $7\frac{1}{2}$ times $50 per acre?

12. If I do a piece of work in 30 days, what part of it will I do in $5\frac{1}{3}$ days?

13. I have $36300; $\frac{1}{3}$ of my money is $\frac{1}{8}$ of my brother's. How many dollars has he?

14. The sum of three numbers is $126\frac{2}{3}$; two of the numbers are $16\frac{1}{4}$ and $6\frac{1}{4}$. What is the other?

15. If I buy oranges at the rate of two for five cents, and sell them at five cents apiece, how much do I make on 580 oranges?

16. A boy being asked how many marbles he intended to buy, said that $\frac{3}{5}$, $\frac{3}{4}$ and $\frac{5}{6}$ of them would be 42924 marbles. How many did he put into his stock?

17. A man sold $\frac{1}{4}$ of his sheep, and afterwards $\frac{1}{3}$ of the remainder, then had 504. How many sheep had he at first?

18. A house cost $9720; the lot cost $\frac{1}{4}$ as much, lacking $1500. What was the cost of the lot?

19. I exchanged 480 pounds of tea, at 5 cents an ounce, for 96 gallons of wine at $25\frac{3}{4}$ cents a gill, and paid the balance in cash. How much cash did I give?

20. If 45 tons are required to last 50 horses one winter, how many tons are needed to supply 120 horses 7 winters?

21. A man owned $\frac{3}{5}$ of a boat, and said his share of the boat was eleven times that of his brother, who owned $\frac{3}{10}$ of it; but making a mathematical mistake gave an incorrect answer. How many times was his share?

22. I exchanged 75 firkins of butter, averaging 56 pounds, at 33 cents per pound, for 2016 gallons of syrup. What was the syrup worth per gallon?

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23. What is the amount of the following bill?

25 pounds tea, at	$ .90⅘
45 sacks flour, at	1.15
40 pounds sugar, at	.12½
2 boxes peaches, at	.35¼

24. If from a piece of cloth containing 87½ yards, 13¾ yards are cut at three different times, how many yards will there be remaining?

25. At 1⅛ dollars a bushel, how many bushels of wheat can be bought for 57 barrels of pork, at $11⅛ a barrel?

26. What is the cost of 650 pounds of rice, at $9¼ a cwt.?

27. A farmer sold ⅓ his sheep at one time, ⅓ of the remainder at another, and ⅓ of what then remained at another. What fraction of the whole had he left?

28. If to ⅓ of 2½ times a number 200000 be added, the sum will equal $\frac{7}{10}$ of the original number. What was the original number?

29. A man having a stock of merchandise valued at $3742½, sold ⅓ of it at a gain of ¼ of its cost, and the remainder at a loss of $675. Did he gain or lose by the transactions, and how much?

30. What is the cost of 108 inches of ribbon, at 40⅘ cents a yard.

31. A member of a club spent ¼ of his time in playing ball, ⅓ in sleep, ⅓ in smoking, ⅛ in traveling, ⅛ in reading, and $\frac{1}{12}$ in eating. How much time remained?

32. A chimney 125 feet high, was blown off 75 feet from the ground. How many feet were blown off, and what fraction of the whole was left standing?

33. I have ⅘ of ⅝ of $50000. My money is 3½ times John's. How much has John?

34. I sold 17½ cords of wood at $9½ per cord, and received in payment wheat at $⅘ per bushel. How many bushels did I buy?

35. 32⅘ is $\frac{1}{25}$ of what number?

36. The product of three numbers is 126⅘; two of them are 16¼ and $6\frac{1}{15}$. What is the other number?

37. What is the entire cost of 20 cwt. of spice at 3½ cts. an oz., and 110 gal. of milk at 3¾ cts. per pt.?

38. If ¼ of a gal. of wine cost $6, how much can be bought for $36.50?

39. Two men start from the same point and travel in opposite *directions, one at* the rate of 3½ miles an hour, and the

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other at the rate of $5\frac{1}{8}$ miles. How far apart will they be at the end of $2\frac{4}{5}$ days, if they travel $8\frac{1}{4}$ hours each day?

40. Bought of J. T. Sherman & Co.

128 yds. print,	@	$ .12$\frac{1}{2}$
150 rolls tape,	"	.03$\frac{1}{2}$
100 yds. flannel,	"	1.35$\frac{1}{4}$
200 pieces muslin,	"	2.20$\frac{1}{2}$

I gave in part payment a check for $75, and the remainder was to be paid in 30 days. What was the final payment?

41. $\frac{1}{2}+\frac{3}{8}+3\frac{1}{4}\times 4\frac{1}{2}-3\frac{3}{8}=$?

42. What number must be added to $6\frac{4}{7}$ to make it $9\frac{1}{2}$ times $8\frac{4}{14}$?

43. If a pole $26\frac{1}{8}$ feet in height cast a shadow of $29\frac{1}{2}\frac{1}{6}$ feet in length, what will be the length of a shadow cast by a tree $30\frac{4}{7}$ feet in height?

44. If $6\frac{1}{2}\frac{1}{3}$ is the dividend, and $19\frac{4}{7}$ the quotient, what is the divisor?

45. A farmer exchanged 8 tubs of butter, each containing $57\frac{1}{2}$ lb. at $37\frac{1}{2}$ cts. a lb., and 12 bbl. of apples, each containing $3\frac{1}{2}$ bu., at $75\frac{1}{4}$ cents per bu., for groceries to the amount of $101.48, and the remainder in cash. How much money did he receive?

46. The product of two factors is $156\frac{9}{101}$; one of them is $11\frac{8}{101}$. What is the other?

47. A man owned a certain number of acres of land. He sold $\frac{1}{3}$ of $\frac{4}{5}$ of it + 24 acres, and had left $\frac{5}{8}$ of the original number. How many acres had he at first?

48. Will you increase or diminish the terms of the fraction $\frac{4}{11}$ if you add 6 to the numerator and 5 to the denominator, and how much?

49. A carriage cost 1275 dollars, which was $2\frac{1}{2}$ times the price of the horses, less 100\frac{4}{5}$; the horses were $2\frac{1}{2}$ times the price of the harness, less $63\frac{3}{4}$ dollars. What were the prices of the horses and harness?

50. A man manufactured into rings $1\frac{1}{2}$ lb. of gold, into rings each weighing $1\frac{1}{2}$ pwt. How many rings did he manufacture, and what was their value at $2.75 a pwt.?

51. If to $\frac{4}{7}$ of a number 8000 be added, the difference between that sum and the original number will equal $\frac{1}{7}$ of the original number. What is the original number?

52. A dealer in tea wholesaled $\frac{1}{3}$ his stock, at a gain of $\frac{1}{5}$ of a dollar a pound, and retailed the remainder at a gain of $\frac{3}{8}$ of a dollar a pound; his entire gain was $975. How *many* pounds had he?

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53. If the subtrahend is $2\frac{1}{3}+9\frac{4}{5}$, and the remainder is $3\frac{11}{14}$, what is the minuend?

54. A man paid \$3570$\frac{7}{10}$ for a house and lot, and the repairs cost $\frac{1}{7}$ as much as the price paid. He sold them for twice the purchase price, less \$1785$\frac{4}{10}$. Did he gain or lose, and how much?

55. What is the entire cost of $20\frac{1}{2}$ firkins of butter @ $35\frac{1}{3}$ cents per lb., and two chests of tea, weighing respectively $40\frac{1}{2}$ and $35\frac{1}{3}$ lb., at $98\frac{3}{4}$ cents per lb.?

56. A and B can build a wall in $37\frac{1}{2}$ days; A can build it alone in 60 days. How many days would it take B to build it?

57. $\frac{1}{3}$ of my money is in United States bonds, $\frac{3}{4}$ in land, and the remainder which is \$6600, is in the bank. How much am I worth?

58. I own $\frac{3}{4}$ of a factory, and sell $\frac{1}{3}$ of my share to James. James sells $\frac{1}{4}$ of his share to John. What part of the factory has John, and what is the factory worth if John's share is worth \$9000?

59. If $112\frac{1}{2}$ bushels of wheat make 24 barrels of flour, how many bu. of wheat are required to make 435 bbl. of flour?

60. \$5000 is $\frac{1}{10}$ of A's money, $\frac{1}{5}$ of B's, 10 times C's, and 5 times D's. How many dollars have all?

61. If I buy wheat at the rate of 9 bushels for $\$11\frac{1}{4}$, and sell at the rate of $22\frac{1}{2}$ bushels for $\$33\frac{3}{4}$, how much do I make on 580 bushels?

62. A, B and C agree to share equally, for a month, their incomes. A's is \$144; B's is $\frac{7}{8}$ as much as A's less 16 dollars, and C's is $\frac{4}{5}$ as much as B's, plus 28 dollars. What will be the share of each?

63.

Chicago, June 4, 1882.

James Steele,

Bo't of Thomson & Co.,

120 lbs of butter,	@	\$	$.38\frac{1}{2}$
75 " coffee,	"		$.28\frac{1}{3}$
400 " sugar,	"		$.13\frac{1}{2}$
20 doz. eggs,	"		$.22\frac{1}{2}$
75 lbs. tea,	"		$.75\frac{3}{5}$

Make out bill and receipt it.

64. Two men start from opposite points to travel towards each other, one at the rate of $5\frac{1}{2}$ miles an hour, and the other at the rate of $4\frac{3}{4}$ miles an hour. If they travel 8 hours a day, how many days before they will meet, the distance between them being $273\frac{1}{2}$ miles?

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65. What will be the cost of 5 lb. of quinine @ 40½ cents per pwt. ?

66. If to ⅘ of a man's age 4 be added, ⅓ of the sum less 5, will equal the age of his youngest son, which is 11 years. What is the father's age?

67. If $6\frac{1}{2}\frac{3}{8}$ is the dividend, and $19\frac{3}{7}$ the quotient, what is the divisor ?

68. What is the quotient of $\frac{\frac{3}{4} \text{ of } 9\frac{1}{3}}{\frac{8}{11} \text{ of } 15}$ divided by $\frac{\frac{3}{5} \text{ of } \frac{1}{3} \text{ of } 2\frac{1}{2}}{\frac{1}{4} \text{ of } 19\frac{1}{2}}$?

69. A man having a journey of $478\frac{11}{16}$ miles to make, travels $78\frac{3}{4}$ miles the first day, $102\frac{3}{8}$ the second day, and the remainder of the distance in three days. What was the average distance traveled on each of the three days ?

70. A man purchased a farm of 480 acres, paying for ⅝ of it $45⅜ an acre, and the remainder at $37½ per acre. He sold it at a gain of ⅛ on the amount paid. What was the selling price ?

71. A house, lot and furniture were valued at $45000. The value of the house was ⅘ of the entire value, and the furniture ⅔ of the value of the house. The house is insured for $\frac{7}{10}$ its value, and the furniture for ⅘ of its value, less $2500. If the house and contents were destroyed by fire what would be the actual loss ?

72. What is the cost of 288 dozen pens at 40½ cents a gross, and 2 bales of paper at 18½ cents per quire?

73. Two men starting from the same point and traveling in the same direction are going, one at the rate of 10¼ miles an hour, and the other at the rate of 9⅔ miles an hour. How far apart will they be in 7½ days, if they travel 10½ hours each day ?

74. A piece 30 feet in length, is blown from the top of a pole, and ⅖ of the original length are left standing. What was the length of the pole ?

75. I bought 325 barrels of flour @ $9¼ a barrel, 224 barrels at $10⅜ a barrel, and sold it all so as to gain $1079. What was the average selling price per barrel ?

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SIXTH GRADE.

NOTE.—The examples for addition, in the first Lessons, can be used for a thorough drill in reading and writing decimals, before the regular work is commenced. The principle of removing the decimal point should be thoroughly explained from the board.

All examples in decimals should be carried out four places.

LESSON I.

1. Add 9 and nine ten-thousandths; eighty-five hundredths; 7 and four-tenths; 1000 and twenty-five ten-thousandths; and 784 and four millionths.
2. Add 40 and fifty-six hundred-thousandths; 1001; 800 and six-tenths; 1000 and one-thousandth; and forty-five millionths.
3. Reduce .8, .095, .16, .0035, and .004 to a common denominator.
4. Reduce .027, .00004, 83, .06, 72.008, .0105 to a common denominator.
5. Reduce 400.3, 60.0041, 12.7, 200.000048, 2700.04 to a common denominator.

LESSON II.

1. Add 36 and five tenths; 22 and three hundred and four ten-thousandths; 316 and seventeen hundred-thousandths; 100 and one-hundredth; 80 and eight millionths.
2. Reduce 20 and twenty ten-thousandths; 800 and eighty-five millionths; 42 and seven tenths; 896; and 408 and sixty-seven ten-millionths to a common denominator.
3. Reduce $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{5}$, $\frac{1}{8}$, and $\frac{3}{10}$ to decimals.
4. Reduce $\frac{5}{8}$, $\frac{3}{16}$, $\frac{2}{25}$, $\frac{3}{80}$, and $\frac{8}{125}$ to decimals.
5. Add 48.1, .00481, 481, 648.006, 700.4, and 30.84.

LESSON III.

1. Add 10006 and fifteen ten-thousandths; 28 and twenty thousandths; 16 and thirty-five hundred-thousandths;

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seventy-five thousandths; and 8000 and eight hundred hundred-thousandths.

2. Reduce 10 and ten hundredths; 40 and fifty-seven hundred-thousandths; 8002; 701 and nine hundred and five millionths; and 1 and one tenth, to a common denominator.
3. Reduce $\frac{4}{10}$, $\frac{18}{4800}$, $\frac{3}{10000}$, and $\frac{113}{118}$ to decimals.
4. Reduce .5, .6, .02, .72, and .135 to common fractions.
5. Reduce .093, .008, .024, .0093, and .218 to common fractions.

LESSON IV.

1. Add 26 and seven hundred-millionths; 200 and sixteen hundred-thousandths; 1040 and eight ten-millionths; 34 and six ten-thousandths; and 40 and one tenth.
2. Reduce 45 and one ten-thousandth; eighty-seven millionths; 900 and ten ten-thousandths; 48 and fifty hundred-thousandths; and four thousand and eight hundred-millionths, to a common denominator.
3. Reduce $4\frac{1}{4}$, $400\frac{17}{20}$, $\frac{18}{8000}$, $\frac{1}{25}$, and $25\frac{1}{8}$ to decimals.
4. Reduce 3.025, 253.3, .0078, .6363, and 3.030 to common fractions.
5. Reduce $\frac{3}{5}$ of $\frac{1}{8}$ of $2\frac{1}{3}$ to a decimal.
   Reduce $\frac{1}{3}$ to a decimal.

LESSON V.

1. Add 10000 and sixteen millionths; 14 and ten hundred-thousandths; 18000 and nine hundred-millionths; 2040 and twenty-four hundred-thousandths; and seventeen ten-thousandths.
2. Reduce 400 and thirty hundred-thousandths; ninety-six hundred-millionths; 70 and one tenth; 4000000 and four millionths; 6 and three ten-thousandths, to a common denominator.
3. Reduce $\frac{1}{3}$ of $\frac{1}{5}$ of $\frac{1}{4}$ to a decimal.
   $\frac{12}{15} \times \frac{13}{3} \times \frac{1}{10} \times \frac{5}{8} =$ what decimal?
4. $\frac{3}{16} + \frac{3}{4} + \frac{1}{2} =$ what decimal?
   $\frac{4}{64} \div \frac{22}{135} =$ what decimal?
5. Reduce to common fractions in their lowest terms, .0045, .315, .175, 4.6, .1000.

LESSON VI.

1. Add 12 and thirty-five hundredths; eighty-eight hundred-*thousandths*; 12 and twenty-millionths; 79000 and sev-

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enty-nine thousandths; 80 and one hundred and sixty thousandths; 70 million and seventy ten-millionths.

2. Reduce to 5 decimal places and add $\frac{14}{45}$, $\frac{9}{50}$, and $\frac{71}{4\,3\,5}$.
3. What is the sum of \$4850.25, \$518$\frac{7}{8}$, \$1408, \$37$\frac{1}{2}$, and \$420$\frac{4}{5}$?
4. What is the sum of 78 units, 36 tenths, 380 hundredths, 75 thousandths, 96 ten-thousandths, and 45 millionths?
5. $298.30\frac{1}{2}+27\frac{7}{8}+340.12+30.0034\frac{1}{8}=?$

LESSON VII.

1. Change to equivalent decimals and add \$70$\frac{3}{4}$, \$79.09, \$14$\frac{1}{8}$, \$78$\frac{1}{2}$, \$145$\frac{1}{5}$, and \$$\frac{7}{5}$.
2. $24.6\frac{1}{2}+37.40\frac{7}{3\,5}+5+3784\frac{1}{8}+4.23787\frac{3}{8}=?$
3. $57.843+8\frac{9}{10}+21.04+18\frac{1}{2\,0}+7\frac{1}{5}=?$
4. \$$6\frac{3}{8}$ + \$$30\frac{7}{10}$ + \$32.08 + \$$12.78\frac{1}{2}=?$
5. $90\frac{3}{16}+75.409+\frac{4}{4\,5}+3.7+9.9+7\frac{3}{8}=?$

LESSON VIII.

1. Reduce to decimals and add, $\frac{3}{7\,5}$, $140\frac{1}{8}$, 86, $17\frac{7}{8\,0}$, and $\frac{3}{1\,0\,0}$.
2. Reduce to fractions in their lowest terms, .00075, .25$\frac{4}{8}$, .08$\frac{4}{5}$, .0040, and .204.
3. Add 2 and seventy-five ten-thousandths; four hundred forty tenths; seventeen millionths; 78 and sixteen tenths; and 10 ten-thousandths.
4. Find the difference between 3 and 25486 hundred-thousandths.

   Find the difference between \$17$\frac{7}{8}$ and \$230
5. From 110000 take 3 millionths.

   From 1000000 take 1 millionth.

LESSON IX.

1. \$$750\frac{3}{4}-(\$40\frac{1}{2}\times 2.24)+\$75\frac{3}{2\,5}=?$
2. $(\$300-\$175\frac{1}{4})\times(\$\frac{3}{4}+\$3.5)=?$
3. $(40075\times.204)+(35\frac{3}{16}\times 10)=?$
4. $3\frac{1}{4}+.04+43\frac{4}{16}+.0367+2\frac{37}{9\,6\,1}=?$
5. Change to common fractions, in their lowest terms, .875, .4375.

LESSON X.

NOTE.—Division of decimals is simplified by making the divisor a whole number, and removing the decimal point in the dividend as many places to the right as there are decimal places in the divisor. Should the dividend *be a whole number,* annex as many ciphers to it as there are decimal

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places in the divisor; the quotient will then be a whole number. All ciphers annexed in excess of those above named, will count as decimal places in the quotient.

1. How many times is $4.76 contained in $1.904?
2. $4 \div 18\frac{3}{4}$ equals what decimal?
   $2 \div 31\frac{1}{4}$ equals what decimal?
3. 2000 will divide $17\frac{1}{2}$ what decimal of a time?
4. $75\frac{3}{8} \div 200$ equals what decimal?
   27 will contain $37\frac{1}{2}$ what decimal of a time?
5. $.001 \div 100 = ?$ $100 \div .001 = ?$

LESSON XI.

1. If 128 tons cost $9632, how many tons can be bought for $3461.50?
2. How many coats can be made from 64.8 yards, if 5.4 yards are required for one coat?
3. At $574\frac{1}{2}$ a lot, how many lots can be bought for $9771.60?
4. If 250 bushels cost $165, how many barrels, each containing $2\frac{1}{2}$ bushels, can be bought for $448.80?
5. If $3\frac{1}{2}$ bushels of wheat cost $11.37\frac{1}{2}$, what will $40\frac{1}{4}$ bushels cost?

LESSON XII.

1. If $\frac{3}{4}$ of a hundred pounds of sugar cost $12\frac{5}{8}$, how many pounds can be bought for $93.50?
2. I gave $21\frac{1}{2}$ cords of wood at $4\frac{1}{2}$ per cord, for 15.48 barrels of flour. What was the price per barrel?
3. A man sold a horse for $250, and received in payment $12\frac{1}{2}$ yards of cloth at $6\frac{1}{2}$ per yard, and the remainder in cash. How much cash did he receive?
4. $\frac{3}{4}$ of $32 \div \frac{3}{4}$ of $.042 = ?$
   $4.25 \times 100 \div .001 = ?$
5. $1000 \div .0001 = ?$ $.0001 \div 1000 = ?$

LESSON XIII.

1. I paid $121.50 for wood, at $3.37\frac{1}{2}$ a cord. How many cords did I buy?
   At $57\frac{1}{2}$ an acre how many acres can be bought for $6440?
2. I buy a piece of goods, containing 210 yards, for $525. I wish to sell it so as to gain $157.50. What is the selling price per yard?
3. *12 ÷ 200* equals what decimal?
   800 ÷ 1200 equals what decimal?

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4. $170.50 \times 1.37\frac{1}{2} = ?$
12.0306— 29 millionths =?
5. $1000 \div .0010 = ?$ $.0010 \div 1000 = ?$

LESSON XIV.

1. $5 \div .005 = ?$ $.005 \div 5 = ?$
2. $.5 \div .05 = ?$ $112 \div .0014 = ?$
3. $3875 \div 2000 = ?$ $5 \div 5$ millionths $= ?$
4. $4\frac{4}{9} \times 7\frac{3}{7}$ equals what decimal?
$13\frac{4}{7} \div 4 - 2\frac{2}{3}$ equals what decimal?
5. $510\frac{5}{8} \div 30 + (3 \times \frac{7}{8} \times \frac{8}{3} \times 4\frac{2}{5}) - (3\frac{7}{8} \times \frac{8}{3} \times 4 \times \frac{2}{5})$ equals what decimal?

LESSON XV.

NOTE.—Complex decimal fractions are reduced to common fractions by considering the mixed number as the numerator of the fraction, and the denominator of the *decimal* fraction as the denominator of the fraction; then reduce to simple fractions.—See Ex. 2.

1. Divide .9 of 4 by $\frac{5}{7}$ of $3\frac{1}{4}$.
$\frac{3}{7}$ of $96 \times \frac{14}{10} \times 25\frac{3}{5}$ equals what decimal?
2. Change to fractions in their lowest terms, .75, .125. .0025, .00105, and $.333\frac{1}{3}$.
3. $.00986 \times 1000 \times (1 - \frac{1}{8} + .025) = ?$
4. $.15\frac{1}{4} \times .06\frac{1}{4} \div .014 \div 1000 \div .008 = ?$
5. $.89 \times 89 - 2.489 \div 10 \div 12 \div .01 = ?$

LESSON XVI.

1. $4 - .596 \div .08 -$ 253 millionths $\times 100000 = ?$
2. $46 \times .009 -$ 18 hundredths $\div .012 \div 5 = ?$
3. $.0625 \times 4000 \times .00025 \div 1000 \times 18000 = ?$
4. Reduce to common fractions, .000850, $.018\frac{3}{4}$, $.024\frac{3}{8}$, 6.750, and $16.66\frac{2}{3}$.
5. Change to decimals, $\frac{4}{5000}$, $\frac{6}{7}$, $\frac{8\frac{3}{4}}{17\frac{1}{2}}$, $\frac{4}{800}$, $\frac{9}{5000}$.
From 10 millions take 10 millionths.

LESSON XVII.

1. Change to decimals and add, $68\frac{1}{250}$, $48\frac{3}{500}$, 152.17, $95\frac{3}{5}$, $56\frac{1}{8}$, and divide the sum by .011.
2. Reduce to common fractions, .0048, $56.26\frac{1}{2}$, $208.00\frac{1}{4}$, $.08\frac{1}{4}$ and .00008.

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3. $6 \div 18\frac{3}{4} \times 200 - 25$ thousandths $\div 1000 \div 12 = ?$
4. $84 \div 31\frac{1}{4} \times .09 \times 1000 - 9$ tenths $\div .07 = ?$
5. A man bought 19.3 barrels of sugar, at $20\frac{1}{8}$ dollars a barrel, and sold it at a gain of $100.56. What did he receive for it?

LESSON XVIII.

1. $(30 \times 18.5) \div (.5 \text{ of } 2.75) \times 200 - 87$ thousandths $\div 12 = ?$
2. $.454 \times .15 \times 100 - 9$ ten-thousandths $- .79 \div 4 = ?$
3. $40.4755 \div 12.30 \div 100 \div 12 = ?$
4. Reduce to common fractions, $.25\frac{3}{8}$, .00025, .18, $.053\frac{1}{3}$, and $.003\frac{2}{3}$.
5. From 1000000 take 1 millionth.
   From 1 millionth take 1 ten-millionth.

LESSON XIX.

1. $(2.016 \div 36 + 126 \div 4000 \times 100) - \frac{1}{6} = ?$
2. $(1428 - 714) \div (.34 - .034 \times .25) = ?$
3. $(.96 \div 1600 \times 10000 + 12.8 \div .16) \div .125 = ?$
4. $68 \times .386 + 5.4 \times .4\frac{1}{2} \div (4.81 - \frac{2}{5} \text{ of } 1.662) = ?$
5. $(\$525.80 \div 5.6) \times .084 + \$.2\frac{7}{8} = ?$

LESSON XX.

1. $4 - .498 \div .08 - 253$ millionths $= ?$
2. $45 \times .007 - 18$ hundredths $\div .024 \div 8 = ?$
3. $.25 \times 8000 \div .00025 \div 1000 = ?$
4. Reduce to common fractions, .000425, $.018\frac{3}{4}$, $.012\frac{2}{3}$, 1.750, and $8.66\frac{2}{3}$.
5. Change to decimals and add, $.34\frac{1}{2}\frac{8}{5}$, $23\frac{1}{2}\frac{8}{5}$, $50\frac{1}{2}\frac{1}{5}$, $95\frac{3}{8}$, $56\frac{4}{5}$, and divide the sum by .022.

LESSON XXI.

1. Reduce to common fractions, .0048, $.30\frac{2}{3}$, $50.00\frac{1}{6}$, $.08\frac{1}{3}$, and .0008.
2. $3 \div 18\frac{3}{4} \times 200 - 25$ thousandths $\div 1000 \div 12 = ?$
3. Change to decimals $\frac{2}{2\,5}$, $\frac{8\frac{3}{4}}{17\frac{1}{2}}$, $\frac{3}{2\,4\,0}$, $\frac{1}{2\,5\,0}$, and $\frac{4}{7}$.
4. $8.4 \div 31\frac{1}{4} \times .09 \times 1000 - 1$ and 8 tenths $\div .07 = ?$
5. $56\frac{3}{4} \div \frac{2}{5} \times 16.9 \div 5 = ?$

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LESSON XXII.

1. $(75 \times 52.5) \div (.5 \text{ of } 1.75) \times 200 - 174$ thousandths $\div 2.4 = ?$
2. $730 \times .15 \times 2000 -$ 18 ten-thousandths $-$ 79 hundredths $\div 9 = ?$
3. $212.0265 \div 19.05 \div 1000 \div 4 = ?$
4. Reduce to common fractions, $17.00\frac{4}{5}$, .000750, $32.054\frac{1}{2}$, $.006\frac{1}{3}$, $.000\frac{5}{8}$.
5. Reduce to decimals $\frac{1}{3\,1\,6}$, $28\frac{14}{1\,0\,0\,0}$, $6\frac{24}{8\,0\,0}$, $\frac{6}{2\,4\,0\,0\,0}$, $\frac{14}{16}$.

LESSON XXIII.

1. $(2.016 \div 36 + 63 \div 2000 \times 400) - \frac{8}{10} = ?$
2. $(1728 - .1728) \div (.68 - .068 \times .25 \text{ of } 6) = ?$
3. $(.96 \div 1600 \times 20000 + 3.2 \div .08) \div .25 = ?$
4. $68 \times .386 + 5.4 \times 4\frac{1}{3} \div (4.81\frac{2}{3} \text{ of } 1.662) = ?$
5. $(525.80 \div 11.2) \times .0042 + .02\frac{7}{8} \times 1000 = ?$

LESSON XXIV.

1. $36\frac{1}{5\,0} \times .0062\frac{1}{2} \times 1100 \div 11 \div 100 \div .03 = ?$
2. Reduce to decimals and add, $36\frac{4}{5}$, $\frac{11}{12}$, $.00\frac{8}{4\,5\,0}$, $.1\frac{8}{3\,6}$, $.02\frac{17}{3\,0}$.
3. Reduce to common fractions, $8.04\frac{1}{5}$, $.02\frac{1}{1\,0\,0}$, 36.006, .075, $.02\frac{17}{3\,0}$.
4. Reduce to decimals, $\left(\frac{3\frac{1}{2}}{9} \div \frac{4\frac{3}{5}}{4\frac{1}{2}}\right) \times \frac{8}{10} \times \frac{1}{3}$.
5. $2\frac{3}{16} - 4368$ millionths $= ?$
   $1\frac{3}{18} - .2\frac{1}{3} = ?$

LESSON XXV.

1. Change to decimals $4\frac{1}{5\,0\,0\,0\,0}$ and $.0\frac{4}{12\,5\,0}$.
2. $8 \times 2.4 \times 1000 - 138$ ten-thousandths $\div 100 \div 22 = ?$
3. $1200000 \times .00014 \div .024 \div 2500 \div 700 \times 1000 = ?$
4. $.1\frac{1}{18} - .01\frac{5}{8} = ?$ $\frac{31}{32} - \frac{49}{125} =$ what decimal?
5. Change to common fractions $.333\frac{1}{3}$, $.06\frac{3}{5}$, and $14.0\frac{1}{2}$.
   Change to decimals $\frac{2}{12\,5\,0}$, and $\frac{17\frac{1}{2}}{350}$.

LESSON XXVI.

1. $.86007 \div 96 \div 6 \times 1000 - 9$ millionths $= ?$
2. $.4\frac{3}{25} - .026\frac{1}{16} + 3.85 \times 100 \div 800 = ?$
3. $.974 \div 4.6 + .5\frac{1}{36} \times 100 \div 18 = ?$
4. Change to common fractions, $.06\frac{2}{25}$, $8.03\frac{3}{39}$, $.0033\frac{1}{3}$, $.012\frac{1}{2}$, and 16.425.
5. *Change to decimals* $.09\frac{4}{25}$, $4.0\frac{1}{13}$, $\frac{1}{4\,0\,0\,0}$, $7\frac{1}{5\,0\,0}$, and $25\frac{13}{6\,5\,0}$.

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LESSON XXVII.

1. $(8-.00072+.632)-(.4683\frac{1}{2}-2\frac{7}{8})=?$
2. $.465\times.75\times2000-56$ thousandths -48 hundredths $\div 8=?$
3. How many pounds of sugar can be bought for \$140.25 if $\frac{3}{4}$ of 300 lbs. cost \$15.75?
4. What is the cost of 125 yards of cloth if 87 yards cost $\$304\frac{1}{2}$?
5. What is the sum of 48 dollars 7 cents, 100 dollars 40 cents, 5 dollars 4 mills, 1000 dollars 10 cents 1 mill, and 20 dollars 5 cents six mills?

LESSON XXVIII.

1. Change to common fractions .006$\frac{1}{4}$, .01$_1\frac{3}{80}$, .02$\frac{3}{8}$, 4.0037$\frac{1}{2}$, .0$\frac{45}{1000}$.
2. What part of $4\frac{1}{2}$ is $1\frac{1}{4}$ expressed decimally?
   What part of $3\frac{7}{8}$ is $9\frac{1}{16}$ expressed decimally?
3. At \$.62$\frac{1}{2}$ per bushel how many bushels can be bought for \$18?
4. What is 325 thousandths of 325?
5. If $20\frac{4}{5}$ tons of coal cost \$100, what will 5.2 tons cost?
   Add decimally $\frac{5}{8}$, $\frac{3}{5}$, $\frac{1}{2}$, $\frac{1}{1000}$, and $\frac{1}{25000}$.

LESSON XXIX.

1. Change to common fractions, .00$\frac{3}{5}$, .001$\frac{1}{4}$, .02$\frac{4}{125}$, 1.0001, 2.00$\frac{3}{40}$.
2. If $75\frac{5}{8}$ bushels cost \$131.25, what will 48.375 bushels cost?
3. A man bought 12 barrels of sugar, each weighing 216 lb., for \$155.52. What did it cost per bbl.?
4. I bought 2 pounds of coffee at \$.18$\frac{3}{4}$ per pound, tea for \$.87$\frac{1}{2}$, butter for \$$\frac{7}{16}$, and gave \$2.50 to the grocer. What change should I receive?
5. Change to decimals, .10$\frac{1}{14}$, $\frac{1}{40}$, 5$\frac{1}{400}$, 1$\frac{6}{500}$, $\frac{25}{25000}$.

LESSON XXX.

1. Change to common fractions, 1.0035, .010, .4004, 7$\frac{3}{10}$, and 48.0$\frac{1}{40}$.
2. Multiply 1000000 by one-millionth.
3. $(\frac{99}{100}\times.8\frac{1}{4}+.01228\times\frac{1}{2})\times100=?$
4. *What is* the cost of 1073440 bricks at \$4.75 per M?
5. *What is the* cost of 4216 feet of lumber at \$1.56$\frac{1}{4}$ per C?

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LESSON XXXI.

1. A man sold 3 pieces of print of 28 yards each at \$.18⅜ per yard, 12 pieces of 34 yards each at 8½ cents per yard, and received in payment 50 bushels of oats at 68 cents per bushel, and the balance in money. How much money did he receive?
2. What is the cost of 5400 pineapples at \$16¼ per 100?
3. What is the cost of 1750 ft. of boards at \$9½ per 1000?
4. What is the cost of 1080 oysters at \$1.86 per C?
5. Reduce to decimals $\frac{3}{25}$, $50\frac{1}{4}$, $30\frac{1}{16}$, $.0200\frac{7}{125}$, and $48\frac{11}{25}$.

LESSON XXXII.

1. Reduce to common fractions 8.005, $38\frac{5}{400}$, $1.0\frac{3}{1000}$, $.004\frac{2}{500}$, and .000125.
2. What is the difference between 8 ten-thousandths and 12 millionths?
3. What is the cost of 9120 pounds of hay at \$18 a ton?
4. What is the cost of 432 thousandths of a cord of wood at \$7.75 per cord?
5. What is the value of 4320 ft. of boards at \$2.50 per 100?

NOTE.—Aliquot parts of a dollar must be taken fractionally in solutions.

LESSON XXXIII.

SOLUTION.—What is the cost of 128 yds. of cotton, at 6¼ cts. a yard. Since one yard costs $\$\frac{1}{16}$, 128 yds. will cost as many dollars as 16 is contained times in 128=8 times.

1. What is the cost of 125 lb. at \$16 per ton?
2. What is the cost of 8 lb. at \$18¾ per ton?
3. What is the value of 75 sacks, each containing 81¼ lb., at \$51¾ a ton?
4. What is the cost of 3170 lb. at \$9½ a ton, and 10160 lb. at \$6¼ a ton?
5. Add 40 dollars, 40 cts., 4 mills; 1050 dollars, 65 cts., 9 mills; 7 dollars, 30 cents, 1 mill; 500 dollars, 70 cts., 5 mills; \$3000.

LESSON XXXIV.

ANALYZE.—What is the cost of 288 bu. of potatoes at 20 cts. per pk.?

1. *What is the cost* of 50.42 acres if ⅛ of an acre costs \$15⅜?

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2. What part of $20\frac{1}{4}$ is .125 ?
3. What is the cost of 85 lb. of tea at $31\frac{1}{4}$ cts. per .5 of a lb. ?
4. What is the cost of 9320 feet of lumber at $\$6\frac{1}{4}$ per C ?
5. A grocer pays 95 dollars 50 cents for tea, \$27.15 for soap, 48 dollars $37\frac{1}{2}$ cents for flour, 80 dollars $12\frac{1}{2}$ cents for sugar. What amount did he pay out?

LESSON XXXV.

ANALYZE.—What is the cost of 240 lb. of soap at $12\frac{1}{2}$ cts. per lb. ?

1. $814\frac{8}{10} \times 26\frac{1}{3}\frac{1}{3}$ equals what decimal?
2. If one ton cost \$9.87, what will 984 thousandths of a ton cost ?
   What is the value of 4200 sacks of coffee, of 75 lbs. each, at $\$52\frac{1}{2}$ per ton?
3. I bought 48000 ft. of lumber at \$17.70 per M, and retailed it at $\$2\frac{1}{2}$ per C. What was my gain or loss ?
4. What is the value of 1130 ft. of boards at \$2.86 per C ?
5. $500 \div .005 = ?$ $4.6 \div 489 = ?$

LESSON XXXVI.

1. What is the difference between 18 and 325 ten-thousandths, and 13 and 4875 hundred-thousandths.
2. A man bought $82\frac{1}{2}$ bbl. of filberts for \$1361.25, and sold them at a profit of $\$13.87\frac{1}{2}$ per barrel. What did he receive per barrel ?
3. What is the cost of 1287 feet of boards at $\$15\frac{1}{2}$ per M, and 5000 lb. of meal at $\$7\frac{1}{2}$ per ton ?
4. What is the cost of 17080 lb. of bran at $\$5\frac{1}{2}$ a ton, and 1944 ft. of boards at $\$1.62\frac{1}{2}$ per C ?
5. What is the value of 4800 ft. of boards at $\$15\frac{1}{2}$ per M, and 6720 ft. at \$1.65 per C?

LESSON XXXVII.

1. How many lb. can be bought for \$1350 at $6\frac{1}{4}$ cents per pound? At $8\frac{1}{3}$ cts. per lb. ? At $12\frac{1}{2}$ cts. per lb. ? At 10 cts. per lb. ?
2. $923\frac{8}{10}$ equals what decimal?
   If one ton cost \$4.78, what will 875 thousandths of a ton cost?
3. *If* $9\frac{1}{4}$ *barrels of* flour cost \$76, what will $71\frac{1}{4}$ barrels cost?

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4. If .875 of a ton cost $11.27, what will 18¼ tons cost?
5. If 72.96 yards of cloth cost $109.44, what will 28.50 yards cost?

LESSON XXXVIII.

1. If .31 cwt. cost $2.325, what will 300 lb. cost?
2. I bought 80000 ft. of lumber at $14.90 per M, and retailed it at $2½ per C. What was the result of my trade?
3. What is the cost of a ton of plaster if 840 pounds cost $1.428?
4. How many £ in 68520 farthings?
   In 85260d. how many sovereigns?
5. Reduce 85276 gr. to pounds Troy.
   What is the cost of 2750 pounds if 2 tons cost $243?

LESSON XXXIX.

NOTE.—Reduction of Denominate Numbers introduced.

ANALYZE.—What is the cost of 126 lb. at 16⅔ cents per pound?

1. From 200 dollars 10 cents take 10 dollars 5 cents.
   From 480 dollars 1 ct. take 40 cts. 1 mill.
2. £7 9s. 3 far. are how many farthings?
   Reduce to grains 12 lb. 6 oz. 9 pwt. 16 gr.
3. What is the value of 4 lb. 6 oz. 10 pwt. of gold dust at 85 cts. a pwt.
4. In 43728 farthings how many pounds?
   In 39 sov. 19s. 11d. how many pence?
5. A man commenced business with a capital of $15485. At the end of the year he had 2000915 cents. What was his gain?

LESSON XL.

ANALYZE.—What is the cost of 150 lb. of butter at 25 cts. a lb.?

1. Add decimally $\frac{6}{48}$, .18½, 14$\frac{1}{6}$, $\frac{8}{150}$, and $\frac{5}{8}$.
2. In 3 lb. 9 oz. 4 ℥ 2 ℈, how many grains?
   In 12 lb. 16 pwt. how many grains?
3. I bought 80 acres of land at $1¼ per acre, and 120 acres at $5.75 per acre, and sold all at $3.25 per acre. What did I gain or lose?
4. How many prescriptions of 20 grains each can be put up from 2 lb. 2 ℥ 7 ℨ 2 ℈?

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5. A man gave .2 of $\frac{1}{8}$ of his farm to one son, and .7 of the remainder to another. Give decimally what part of the whole farm he had remaining?

LESSON XLI.

1. From $100 take 50 dollars 7 mills.
   From 101 dollars take 1 mill.
2. In 28388 farthings how many pounds?
   In £1 14s. 8d. 2 far. how many farthings?
3. In 32675 ℔ how many lb.?
4. Reduce 47094 Troy grains to pounds.
5. In 23042 gr. Apothecaries' weight how many pounds?

LESSON XLII.

ANALYZE.—What is the cost of 360 bu. of oats at 33$\frac{1}{3}$ cents per bu.?

1. Change to common fractions, .75, .25, .025, .0105, and .333$\frac{1}{3}$.
2. In 6853794 gr., Apothecaries' weight, how many pounds?
3. In 68536 gr. Troy weight, how many pounds?
4. What is the value of 6 lb. 9 oz. and 7 pwt. of gold dust at 90 cts. a pwt.?
5. If a physician puts up 12 prescriptions of 14 gr. each in a day, what quantity, expressed in higher denominations, will he have used in one year?

LESSON XLIII.

ANALYZE.—What is the cost of 128 yards of flannel at 50 cents per yard?

1. $(1.8 \div .018) - (.0072 \div .09) = ?$
2. I bought 2 T. 15 cwt. 31 lb. of sugar, at 12$\frac{1}{2}$ cts. per pound. How much did it cost me?
3. What will be the cost of 4 bu. 3 pk. 3 qt. of seed at 20 cents a quart?
4. In 3 lb. 4 oz. 4 pwt. Troy weight, how many grains?
5. Three persons divided 850 tons so that the first had .5 of it, the second .375 of it, and the third the remainder. The third had how many tons?

LESSON XLIV.

1. *I sold 20900* ft. of lumber for 1018.87\frac{1}{2}$, thereby gaining *$235.12$\frac{1}{2}$*. What was the cost per C?

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2. Reduce 150 days 3 hours 36 minutes 42 seconds to seconds.
3. Reduce 15778463 seconds to days.
4. If 21⅜ cords of wood cost $68.25, what will 60⅜ cords cost?
5. Reduce to common fractions .00425 and .0018¼.

LESSON XLV.

ANALYZE.—What is the cost of 24 doz. spools of thread at 5 cts. a spool?

1. (.8 of ⅘ of 7.5 × 15764) − (½ of .2 of 7862) = ?
2. 50½ is what decimal of 3787.5 ?
3. In 6 wk. 3 da. 19 hr. 10 min. how many seconds ?
   In 8467000 seconds how many weeks?
4. If .75 cwt. of sugar cost $6⅜, how many pounds can be bought for $87½ ?
5. How many spoons, each weighing 6 oz. 4 pwt. can be made from 7 lb. 9 oz.?

LESSON XLVI.

ANALYZE.—What is the cost of 40 gal. of wine at $2.37½ a gallon ?

1. (⅝ of $345.75) + (.6 of $345.75) × 16.25 = ?
2. In 27136d. how many sovereigns ?
   5.616 ÷ 7560 = ?
3. If 2 lb. 8 oz. of medicine be put up into prescriptions of 15 grains each, and sold for $.12½ each, what will it cost?
4. How many hr. longer was January than February of 1848?
5. How many boxes of a capacity of 24 lb. can be filled from 18 cwt. 120 lb. ?

LESSON XLVII.

1. How many pounds Troy in 85360 grains ?
2. How many grains in 26 lb. 7 oz. 5 pwt. ?
3. If a man take a step 1.5 ft. long in a second of time, how many hours will it take him to walk ten miles?
4. How much time will a person gain in 20 years by rising 30 minutes earlier every day?
   In a lunar month of 29 days 12 hours 44 minutes 3 seconds, how many seconds?
5. What is the cost of .845 tons of coal at $7½ per ton ?

LESSON XLVIII.

1. If 72 boxes of raisins of 36 lb. each cost $388.80, what is the *cost per pound?*

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2. I bought 16 bbl. of molasses at 80 cts. per gal. and paid for it with wood at $3½ per cord. How many cords did it take?
3. A farmer bought 7 bbl. 11 gal. 3 qts. of vinegar at 25 cts. a gallon, and paid for it with potatoes at 25 cents per peck. How many pecks did it take?
4. Reduce 2 T. 12 cwt. 70 lb. 10 oz. to ounces.
5. Reduce 239192 ounces to tons.

LESSON XLIX.

ANALYZE.—What is the cost of 24 yd. of silk at $1.16⅔ per yard?

1. A manufacturer bought 2 T. 15 cwt. 20 lb. of tobacco at 20 cents per pound, and made it into cigars of 2 oz. each. If he sold the cigars at 5 cents each, what were his profits?
2. In 12 miles 7 fur. 28 rods how many rods?
3. In 10062 rods how many miles?
4. Reduce 260 pounds to scruples.
5. How many seconds in a solar year?

LESSON L.

ANALYZE.—What is the cost of 160 yards of cloth at $1.06¼ per yard?

1. Reduce 54 m. 7 fur. 38 r. 2 yd. 2 ft. to feet.
2. In 58075 feet how many miles?
3. Reduce 150 acres 23 square rods to square feet.
   Reduce 416295 sq. rods to sq. inches.
4. How many yards in 1500 miles?
   In 5280000 yards how many miles?
5. What will 230 pounds of hay cost at $12 per ton?
   What is the cost of a load of oats, weighing 5824 pounds, at 33⅓ cents per bushel?

LESSON LI.

ANALYZE.—What is the cost of 123 yd. of cloth at $1.33⅓ per yard?

1. In 3 hhd. 1 bbl. 13 gal. 3 qt. 1 pt. 2 gi. how many gills?
2. In 27 hhd. 47 gal. 1 pt. how many gills?
3. How many bottles of a capacity of 1½ pints each will be required to contain ⅔ of a hhd. of wine?
4. *What is* the value of 4892 lb. of corn at $.62 a bushel, and *380 lb. of* oats at 11 cts. per peck?

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5. If $\frac{4}{11}$ of a farm is worth $6400, and it is valued at $50 an acre, how many acres are there in the farm?

LESSON LII.

ANALYZE.—What is the cost of 48 yards of cloth at $.66⅔ a yard?

1. Reduce 2 m. 4. fur. 31 rd. 1½ yd. 2 ft. 7 in. to inches.
2. Reduce 470660 sq. ft. to sq. rds.
3. What is the cost of 2040 ft. of boards at $4.10 per thousand feet?
   What is the cost of 15214 lb. of butter at $33½ per hundred pounds?
4. At $40.33 per 1000, what is the cost of 6500 feet of mahogany?
   What is the cost of 4280 lb. of cheese at $7¾ per hundred?
5. What is the cost of 91½ yards of print at 14¼ cts. per yard, and 45¼ yd. of satin at $.95½ per yd?

LESSON LIII.

1. In 10 lb. 7 oz. 5 dr. 2 sc. 15 gr. how many grains?
2. Reduce 195912 gr. to pounds.
3. $40.1 - 20.7 \times .3 \div .0008 = ?$
4. What is the cost of a chain weighing 3 oz. 2 pwt. at 7 dimes a pwt.?
5. If one bushel of wheat make 48 lb. of flour, how many lb. can be manufactured from 285 bushels?

LESSON LIV.

1. Reduce 25 hhd. 13 gal. 2 qt. 1 pt. to gills.
2. Reduce 87164 gi. to hogsheads.
3. $(78.01 \div 10) + (28.01 \times 10) + (.01205 \div .02) = ?$
4. What is the difference, in seconds, between the months of Nov. Dec. and Jan. taken together, and Feb. Mar. and Apr., in the year 1874?
5. A merchant paid $526.05 for 3½ tons of cheese, and retailed it at 10½ cents per lb. What was his gain or loss?

LESSON LV.

ANALYZE.—What is the cost of 240 yd. of sheeting at 8½ cts. *per yard?*

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1. Divide 800 by .008, multiply the quotient by .06, and divide the product by .006.
2. In £15 10s. 9d. 3 far. how many farthings?
   In 63482 farthings how many pounds?
3. Reduce 16 T. 17 cwt. 16 lb. to lb.
   Reduce 2588928 drams to tons.
4. What must I pay for 3900 feet of boards at $37 per M?
5. How many barrels, of a capacity of 3 bu. 1 pk. each, will be required to contain 3120 bushels of apples?

LESSON LVI.

1. At $6.50 per ton, what will be the cost of 9684 lb. of coal?
2. In $33\frac{1}{3}$ long tons how many pounds?
   Reduce 15482880 drams to long tons?
3. Reduce 39752856 square inches to acres.
   Reduce 42 A. 98 sq. rd. 7 sq. yd. 2 sq. ft. 40 sq. in. to square inches.
4. Find the difference between 28 square feet and 28 ft. square.
5. A grocer bought 320 lb. of coffee for $48, and 480 lb. of tea for $600. He sold the coffee at 20 cents per lb., and the tea for $1.25 per lb. What was his gain?

LESSON LVII.

At $12\frac{1}{2}$ cts per qt., how many quarts of nuts can be bought for $6?

ANALYSIS.—Since 1 qt. cost $12\frac{1}{2}$ cents, or $\frac{1}{8}$ of a dollar, as many quarts can be bought for $6 as there are $\frac{1}{8}$'s in 6, which is 48.

1. In 13330080 sq. rd. how many sq. miles?
   In 7 sq. mi. 11 A. 3 sq. ch. how many rods?
2. $(40.04 \div .0004) + (1.041 \div \frac{5}{1000}) = ?$
3. How many times will a demijohn containing $4\frac{5}{11}$ gallons fill a cup that holds $\frac{1}{2}$ of $\frac{5}{8}$ of a pt.?
4. A man exchanges 140 bu. of rye at $.92 per bu., for 80 bu. of wheat at $1.37\frac{1}{2}$ per bu., and the remainder in oats at 40 cents per bushel. How many bushels of oats did he receive?
5. If 2 lb. of tea are worth 100 oranges, and 140 oranges are worth 168 lemons, what is one pound of tea worth if the lemons are 30 cents a dozen?

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LESSON LVIII.

1. H. S. Dean,

To Ramsen & Co., Dr.

To 8 boxes pens,	@ $	.925
" 12 reams paper,	"	3.20
" 9 boxes envelopes,	"	.50
" 25 histories,	"	1.10

Received payment,

HENRY DWIGHT,
For Ramsen & Co.

2. How many square feet in a room 18 ft. long and 14 ft. wide?
How many square yards in 49248 sq. inches?

3. How many sq. yd. in a floor 18 ft. long and 15 ft. wide?
How many square feet in a floor containing 36 sq. yards?

4. $1 \times .1 \times .1 \times .1 \div .001 = ?$

5. Reduce 480 guineas to farthings.
How many sovereigns in 24960 pence?

LESSON LIX.

1. In 8 A. 104 sq. rd. 10 sq. yd. how many sq. yd.?

2. In 6062898600 sq. in. how many sq. miles?

3. $.001 \times .02 \div .2 \div .0001 \div .1 \div .1 \div .1 = ?$

4. How many days of 10 hr. each will it take to count $20000, counting three cents every second?

5. What number multiplied by three thousandths will produce 2637?
What is the difference between twice 5 and fifty, and twice fifty-five?

LESSON LX.

ANALYZE.—At $16\frac{2}{3}$ cents per pk., how many pk. of apples can be bought for $24?

1. How many rods in a field that is $60\frac{1}{2}$ yd. wide and $90\frac{3}{4}$ yd. long?

2. A field contains 3000 sq. rd. and is 30 rd. wide. How long is it?

3. A boy bought 160 oranges at the rate of 2 for a penny, 180 at the rate of 3 for a penny, and sold all at the rate of 5 for two cents. What was his gain or loss?

4. Reduce $\frac{3}{125}$ *to* a decimal fraction.

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Reduce $\frac{8\frac{1}{4}}{17\frac{1}{2}}$ to a decimal.

5. Reduce .0008 to a common fraction.
Reduce .655 to a common fraction.

LESSON LXI.

1. $20.3 \times 20.3 \div 2 \div 10.15 - 20.3 \times 5 = ?$
2. Reduce the following to pounds and add them:
23040 gr. 1920 dr. 1728 sc. 244 oz.
3. What is the cost of 6545 feet of pine boards at $30 per M, and 4480 ft. of hemlock boards at $3.50 per C?
4. How many yards of carpeting, one yd. wide, will be required to cover a room 18 ft. by 16 ft.?
5. The square measure of a floor is 945 feet, the width is 27 ft. What is the length?

LESSON LXII.

ANALYZE.—How many bushels of corn at $33\frac{1}{3}$ cents per bu. can be bought for $48?

1. How many revolutions will a wheel 15 feet 6 in. in circumference make in going 31 miles?
2. How many yds. of carpeting, one yard wide, will be required to cover a floor 27 ft. by 20 ft.?
3. What will it cost to calcimine the ceiling of a room 18 feet square, at 10 cts. a square yard?
4. How many gallons in 8 barrels?
5. At 35 cents per sq. yd., what will it cost to plaster a wall 54 ft. by 15 ft.?

LESSON LXIII.

1. A man bought 2 T. 8 cwt. 12 lb. of hay at the rate of $1\frac{1}{2}$ cts. a pound. What did it cost him?
2. How many yards of carpeting, 1 yd. wide, will it take to carpet a room 24 ft. long and 20 ft. wide?
3. How wide is a field containing 9600 sq. rods, whose length is 100 rods?
4. How many bags will it take to hold 1440 bushels, if each bag will contain 2 bu. and 2 pk.?
5. The product of three numbers is 24.069. One of the numbers is $150\frac{3}{4}$, another $\frac{\frac{3}{5}}{4\frac{1}{5}}$. What is the third?

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LESSON LXIV.

ANALYZE.—At 25 cents a peck, how many pecks of potatoes can be bought for $9?

1. What will 21325 bricks cost at $5.50 per M?
   What is the freight on 4978 lb. of flour at $.25 per C?
2. Change 11444 inches to rods.
   How many steps 20 inches in length, will a person take in walking 10½ miles?
3. How many fathoms in 45638 inches?
   What is the cost of 1875 miles of cable at 1 ct. an inch?
4. In 4 mi. 11 rods 4 ft. 5 in. how many inches?
   How many fathoms in 91276 inches?
5. At $8.75 a ton, what will 975 pounds of hay cost?

LESSON LXV.

1. What is the cost of 3240 pounds of lime at $6.50 per ton?
   Reduce 748372 yd. to miles.
2. Reduce the month of February, in the year 1848, to seconds.
3. I bought 7 T. 9 cwt. 1 qr. 19 lb. of Russia leather at $.75 a pound, long ton, and retailed it at $1 per pound, short ton. What was the gain?
4. $50.01 - 4.4 - 10.009 \times 1000 \div .00002 = ?$
5. What will be the cost of carpeting a room 21 ft. by 15 ft. at $1.25 per sq. yd.?

LESSON LXVI.

1. ANALYZE.—If one yd. of cloth cost 50 cents, how many yd. can be bought for $12½?
2. What will it cost to transport 5680 pounds of groceries at $4.05 per ton, and 2685 lb. of tin-plate at $3.25 per ton?
3. How many 4 ounce weights can be made from 25 lb. 8 oz. of iron?
4. In 28 mi. 60 rd. 9 ft. 7 in. how many inches?
5. If a man earn $2½ every working day, and spend $.62½ every day, what can he save in a year?

LESSON LXVII.

1. In 42563 inches how many rods?
   Reduce 33 miles 15 yd. 6 in. to inches.
2. What is the cost of 213190 lb. of corn at $56 per hundred bushels?

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3. How many days are saved in 4 score and 8 yr. by rising 20 minutes earlier and retiring 15 minutes later each day, counting leap years?
4. How many times will a wheel 18 ft. 4 in. in circumference turn in going 40 miles?
5. Reduce 26385 oz. avoirdupois to pounds.
   Reduce 26385 oz. Troy to pounds.

LESSON LXVIII.

ANALYZE.—At $4 a ton, what will be the cost of 800 lb. of hay?

What is the cost of 3696 lb. of coal at $8.50 per ton?

1. What is the cost of 3768 ft. of lath at $.80 per C?
   In 1653180 ft. how many rods?
2. In 18 rd. 4 yd. 6 ft. how many inches?
3. What is the cost of plastering a room, the walls of which are 18 ft. by 9 ft., at 75 cts. a sq. yd.?
4. In 5 mi. 51 ch. 73 links how many links?
5. If $15\frac{1}{4}$ bbl. of flour cost $63, what will 10.4 bbl. cost?
   If 9728 ft. of boards cost $140.352, what is the price per M?

LESSON LXIX.

1. Reduce 47 mi. 5 fur. 20 rd. 2 yd. 2 ft. 9 in. to inches.
2. A coal dealer bought 400 long tons of coal, and has sold 250 short tons. How many pounds has he left?
3. What is the distance, in feet, around a field a mile square?
4. Reduce 58346 links to miles.
5. What will it cost to plaster a ceiling 27 ft. by 18 ft., at $.65 per sq. yd.?

LESSON LXX.

1. How many feet of fence will inclose a field 15 ch. 27 links long, and 14 ch. 85 links wide?
2. How many yd. of carpeting, 2 feet in width, will be required to cover a floor 24 ft. by 18 ft.?
3. $40.5 \times 40.5 \div .2 \div 20.25 - .003 \times .1 = ?$
4. How many fields, 40 rods square, can be made from one 160 rods square?
5. How much will be lost on 4 T. 80 lb. spices, bought at 75 cents a pound and sold at $4\frac{1}{2}$ cents an oz.?

LESSON LXXI.

1. $.045 + 8\frac{1}{4} - \frac{1}{100} \times 1.05 \div .05 = ?$
   $6 \div 600 \times .06 + .0006 \div 6 \div \frac{1}{8} = ?$

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2. What is the cost of 18 bu. 2 pk. of corn at $3\frac{1}{2}$ cents a pound, and 20 bu. of oats at $1\frac{1}{2}$ cents a pound?
3. If 1.75 tons cost $10.30, what will $15\frac{1}{3}$ tons cost?
   What is the cost of 40 ft. of boards at $5.25 per M?
4. A man bought 30.5 hhd. of wine at $2.50 per gallon, and retailed it at 40 cents a pint. What was his gain?
5. How long will it take to count $1000050, counting 2 cents every second?

LESSON LXXII.

1. ANALYZE.—At $6 a ton what will 700 lb. of iron cost?
   The product of two numbers is 4.52; one of the numbers is .25. What is the other?
   In 200000 sheets of paper how many bales?
2. A man sold 24 bbl. 27 gal. 2 qt. of brandy at $6.55 a gallon, and took in pay silver ware at 50 cents a pwt. What was its weight?
3. If 5 be added to both terms of the fraction $\frac{5}{13}$, will its value be increased or diminished, and how much?
   If 5 be subtracted from both terms of the fraction $\frac{5}{13}$, will its value be increased or diminished, and how much?
4. $.045 \times .006 + \frac{3}{4} - \frac{1}{40} \div .01\frac{1}{3} \div .02\frac{1}{100} = ?$
5. Reduce $32\frac{1}{2}$ hands to feet and inches.

LESSON LXXIII.

1. Reduce 42 ch. 27 l. to feet.
   Reduce 4 ch. 25 l. to inches.
2. How many feet in 142 fathoms 5 ft.?
   Reduce 5280 fathoms to miles.
3. A has $\frac{1}{3}$ of $1\frac{1}{3}$ times 1840 sheep, and B has $1\frac{1}{3}$ times as many as A. How many has B?
4. How many miles deep is the Atlantic where the sounding is 3200 fathoms?
5. How many statute miles does a ship sail in sailing 140 leagues?

LESSON LXXIV.

1. Reduce 3347830″ to signs.
   Reduce 5 C. 5 S. 5° 5′ 5″ to seconds.
2. How many degrees in 5700 nautical miles?
   In 34200 geographical miles how many statute miles?
3. What will be the cost of plastering the ceiling of a room 45 ft. *long and* 36 ft. wide, at 30 cents a square yard?

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4. To .02 times 20 5 add 5.7 times 18.04—8.0026.
Multiply 2.05 + .825 + 2.8 by 2 — 1.875.
5. How many acres in a field that is 96 rods long and 70 rods wide?
What will be the cost of .6 of a gallon of wine at $4.50 a gallon?

LESSON LXXV.

1.

Dover, Apr. 1, 1880.

Mr. H. C. Clews,

Bo't of J. Simons & Co.,

6 boxes of raisins,	@	$5.75
9 barrels flour,	"	7.75
75 pounds sugar,	"	.09½
36 pounds butter,	"	.33⅓
42 gallons kerosene,	"	.18

Received payment,

J. Simons & Co.

2. What is the cost of 18 sheep at 10s. 9½d. each?
3. How many feet in width is a room containing 43200 sq. in., if the length is 20 ft.?
4. If 72.96 yards of cloth cost $109.44, what will 42.75 yards cost?
5. What will it cost to plaster a ceiling 30 feet long by 18 feet wide, at $.65 per square yard?

LESSON LXXVI.

1. Reduce 47 mi. 5 fur. 20 rods 2 yds. 2 ft. 9 in, to inches.
2. In 480 city lots, each 25 ft. by 100 ft., how many acres?
3. A room is 20 ft. long, 18 ft. wide, and 10 feet high. What will it cost to plaster the walls and ceiling at $.54 per sq. yard?
4. What is the cost of 250 barrels of pork at $5.37½ per hundred pounds?
5. How many pieces, a foot and a half in length, can be cut from two pieces of cloth, each containing 123 yards?

LESSON LXXVII.

Analyze.—What will 10 sacks of coffee, each containing *100 pounds*, cost at $40 per ton?

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1. How many hundred weight in 24 qr. 102400 dr. 3700 lbs. and 4800 oz.?
2. How many sq. yd. of plastering in the walls and ceiling of a room 21 ft. long, 18 ft. wide, and 12 ft. high?
3. What will it cost to calcimine the above room at 20 cents a square yd.?
4. In 29874 lb. of corn how many bushels?
5. A grocer bought 45 boxes of oranges for $405; being damaged he realized only $300 from the sale of them. What was his loss per box?

LESSON LXXVIII.

NOTE.—Cubic Measure.

1. Add, decimally, $\frac{3}{8}$, $\frac{4}{5}$, $\frac{1}{2}$, $\frac{1}{10000}$, $\frac{1}{5000}$.
2. Reduce 49 cu. ft. 180 cu. in., to inches.
   Reduce 11528768 cu. in. to cu. yd.
3. How many times can 1 lb. 8 oz. of tea be weighed from 4 chests, each containing 57 pounds?
4. How many dozen spoons, each spoon weighing 2 oz. 18 pwt. can be made from 17 lb. 4 oz. 16 pwt. of silver?
5. What will it cost to carpet a room 20½ feet by 16 feet, if the carpeting be 2 ft. in width and cost $2.25 per yard?

LESSON LXXIX.

ANALYZE.—At $8 a ton what will 1600 lbs. of hay cost?

1. In 63 cu. yd. 15 cu. ft. how many cubic inches?
2. How many cords of wood in a pile 20 ft. long, 10 ft. wide and 8 ft. high?
3. A grocer bought 2 T. 7 cwt. of cheese at $9.50 per cwt., and retailed it at 12½ cents a pound. What was his gain?
4. A dealer sold 250 barrels of flour at the rate of 4½ cents a lb. How much did he receive for it?
5. At 35 cents per sq. yd. what will it cost to plaster a wall 45 ft. by 27 ft.?

LESSON LXXX.

1. In 37 cords 23 cu. ft. how many cu. ft.?
   Reduce 255488 cu. in. to cords.
2. How many cords in a pile 24 ft. long, 16 feet wide and 6 ft. high?
3. Into how many city lots, 22 ft. by 112 ft., can 22 A. 64 sq. rd. be divided?

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4. What is the cost of transporting 43680 pounds of iron at $5.25 per ton, and 1280 lb. of canned goods at $.75 per hundred?
5. From ½ a pound of quinine, a druggist put up 25 powders of 10 grains each. How many grains had he left?

LESSON LXXXI.

1. How many sq. yards in the walls of a room 27 ft. long, 18 ft. wide and 10 ft. high?
2. How many cords in a pile of wood 32 ft. long, 10 ft. wide and 5 ft. 6 in. high? (Suggestion: consider the inches as fractions of a foot.)
3. $40.5 \times 40.5 \div .2 \div 20.25 - .003 \times .1 = ?$
4. How many pounds in 6 loads of 3⅜ tons each?
5. The circumference of the earth being 25000 miles, into how many sections of 156 mi. 80 rd. each can it be divided?

LESSON LXXXII.

1. How many cu. in. in 9⅜ cords of wood?
2. How many cords of wood in a pile 18 ft. 6 in. long, 16 ft. wide, and 8 feet high?
3. A square field requires 63 chains of fence to inclose it. What is the length of each side?
4. How many more statute than geographical miles in 50 leagues?
5. How many bottles of a capacity of 2¼ pints, will be required to contain a hogshead of wine?

LESSON LXXXIII.

1. Reduce 10877760 cu. in. to cords.
2. What is the length of a pile of wood 10 ft. wide, 8 ft. high, and which contains 1440 cu. ft.?
3. What is the cost of 34½ cwt. of pork at 11 cents per lb., and 475 tons of iron at $4.50 per ton?
4. A merchant buys 2 hhd. of molasses for $56.70, and sells it so as to gain 5 cents a gallon. What was his entire gain, and what was his selling price per gallon?
5. *A load* of wheat weighing 3840 pounds, cost how much at $.80¼ per bushel?

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LESSON LXXXIV.

1. In 576 pounds avoirdupois how many pounds Troy?
   How many more grains in one pound avoirdupois than in one pound Troy?
2. What is the cost of 4696 cocoanuts at \$60¼ per 1000?
3. A manufacturer sold 3456 hoe-handles at \$1.50 per 100. How much did he receive for them?
4. If one degree of the earth's circumference is 69⅛ statute miles, how many statute miles are there in 34200 geographic miles, or 470 degrees?
5. How many minutes or nautical miles in ⅛ of the earth's circumference?

LESSON LXXXV.

1. In 420 pounds avoirdupois how many pounds Troy?
   How many more grains in 5 pounds avoirdupois than in 5 pounds Troy?
2. A load of wheat weighing 3300 pounds cost how much at \$.90½ per bu.?
3. How many leaves are there in an octavo book containing 16 printed sheets? How many pages are there?
4. A ship during a storm changes her longitude 7° 14′. How many nautical miles was she from her direct course?
5. A merchant cut 7⅛ yd. from a piece containing 30¼ yards. What is the value of the remainder at \$2⅔ per yard?

LESSON LXXXVI.

1. How many more grains in 10 lb. avoirdupois than in 10 lb. Troy?
2. A druggist paid \$5.40 for 6 lb. 12 oz. of alum, by avoirdupois, and sold it at 8 cts. an oz. Troy. What was his gain?
3. How many feet in length are two fields, one 10 rds. 18 l. and the other 12 rd. 15 l. long?
4. A druggist bought 82 gallons of brandy for \$344.40, and lost \$33.60 worth by leakage. How many gal. remained?
5. What is the cost of a pile of wood 75 feet long, 12 ft. wide and 8 ft. high, at \$5.60 per cord?

LESSON LXXXVII.

1. Reduce 456 drams apothecaries to Troy.
2. Change 15 *lbs.* 10 *oz.* 10 pwt. Troy to avoirdupois.

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3. Multiply the quotient of .0000075 divided by .015 by the quotient of .00288 divided by 1.2.
4. If a lake is 97 fathoms 3 ft. 2 in. deep, what is its depth in inches?
5. A man sells 240 bushels of wheat at $1.16⅔ per bushel, 114 bu. corn at $.33⅓ per bu., and received in payment 30 barrels of flour at $6.50 per barrel, and the remainder in salt at $1⅓ per barrel. How many barrels of salt did he receive?

LESSON LXXXVIII.

1. How many sheets of paper in 1½ reams?
2. How many cu. in. in 3 bushels?
   How many bushels in 430080 cu. inches?
3. How much will it cost to dig a cellar 20 ft. long, 18 ft. wide and 9 ft. high, at $.37½ a cu. yd.?
4. A druggist put up 4 lb. 10 oz. in prescriptions of 14½ grains each. How many prescriptions were there?
5. Sound moves at the rate of 1120 ft. in a second. The sound of an explosion was 8 seconds in reaching us. What was the distance?

LESSON LXXXIX.

1. How many cubic feet in 2 hogsheads wine measure?
   In a cistern of a capacity of 60 barrels how many cubic inches?
2. Multiply .00018÷.009 by (3.316÷.25—.0074).
3. What will it cost to have 20 cords 64 cu. ft. of wood sawed at 25 cts. a cord foot?
4. What is the difference between 8 sq. ft. and 8 ft. square?
5. If the length of a year is 365 da. 16 hr. 49 min. 25 sec., how many seconds would there be in 14 years?

LESSON XC.

1. How many more cubic inches in 27 quarts dry measure, than in 27 quarts wine measure?
   8 gallons dry measure, contain how many more cubic inches than 8 gallons wine measure?
2. My watch gains 2 seconds every hour. How many minutes will it gain in 20 days?
3. What is the difference between 3⅜ times 8⅓ and 4 times 3½⅓?
4. A grocer paid $1200½ for 8½ tons of cheese, and retailed it at 8½ *cents* per pound. What was his gain?

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5. A grocer bought 6 hogsheads of molasses at 60 cents a gallon, and sold it at 20 cents a quart. What was his gain?

LESSON XCI.

1. A man bought two barrels of cranberries, each containing $2\frac{1}{2}$ bushels, and sold them by wine measure. How many quarts did he gain?
2. If a score and a half of tailors use 4 dozen buttons each in a day, how many great gross will they use in a week, or 6 working days?
3. Reduce $\frac{1}{6\frac{1}{4}0}$ of a £ to the fraction of a penny.
4. Reduce $\frac{1}{6\frac{1}{4}0}$ of a £ to the fraction of a penny.
5. What is the value of 55276 pounds of corn, at 45 cents per bushel?

LESSON XCII.

1. Reduce $\frac{1}{8\frac{1}{4}0}$ of a guinea to the fraction of a pound.
2. Reduce $\frac{1}{7\frac{1}{2}0}$ of a lb. Troy weight, to the fraction of a pwt.
3. How many cu. feet of air in a room 18 ft. long, 16 ft. wide and 10 ft. high?
4. What will it cost, at 45 cents a chain, to fence a lot $\frac{1}{4}$ a mile square, and also divide it into 4 square fields?
5. How many square rods in a field requiring 120 chains of fence to inclose it? What will it cost to fence it at $1.75 per rod?

LESSON XCIII.

1. Reduce $\frac{1}{9\frac{1}{6}0}$ of an oz. Troy weight to the fraction of a grain.
2. Reduce $\frac{1}{9\frac{1}{2}0}$ of a pound apothecaries' weight, to the fraction of a dram.
3. A foundation is 45 ft. long, 22 ft. wide, 16 ft. high and $1\frac{1}{2}$ ft. thick. What did it cost to build it at 1.33\frac{1}{3}$ a perch?
4. At $10.75 a ton what will 1460 pounds of hay cost?
5. If a person's income is 50 cents an hour, what will it be during the summer months?

How many cu. in. in a box $1\frac{1}{2}$ ft. square?

LESSON XCIV.

1. Reduce $\frac{1}{6\frac{1}{2}0}$ of a pound Troy, to the fraction of a grain.
2. What part of a yard is $\frac{1}{7\frac{1}{2}0}$ of a rod?
3. What will it cost to dig a ditch 40 rods long, $2\frac{1}{2}$ rods wide *and* $2\frac{1}{2}$ *feet deep, at* 20 cents a cubic yard?

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4. How many reams of paper in 240 packages of a half-dozen sheets each?
5. How much time would a person gain in a leap year by rising 20 minutes earlier every day?

LESSON XCV.

1. Reduce $\frac{1}{7200000}$ of a square mile to square feet.
2. Reduce $\frac{1}{1080}$ of 2 hhd. to the fraction of a pint.
3. What is the cost of 285 ft. of boards at $11.55 per M, and 3470 feet of timber at $1.75 per C?
4. A merchant bought ten barrels of sugar, each containing 218 pounds, and sold it for $207.10, which was a gain of $2\frac{1}{2}$ cents a pound. What did the sugar cost him?
5. A druggist bought 40 gallons of alcohol at a cost of $60, and retailed it at 50 cents a quart. What was his gain?

LESSON XCVI.

1. How many inches is $\frac{1}{40}$ of $\frac{6}{64}$ of 3 yd.?
2. Reduce $\frac{1}{800000}$ of a mile to the fraction of an inch.
3. A block of stone is 9 ft. long, $2\frac{1}{4}$ ft. wide and $1\frac{1}{3}$ feet high. How many cubic feet does it contain?
4. How many rolls of paper 30 ft. long and $1\frac{1}{2}$ ft. wide will it take to cover the walls of a room 27 ft. long, 18 ft. wide, and 10 feet high, no allowance being made for waste?
5. A grocer bought 361 gallons of milk for $10.80, and sold it at $3\frac{1}{2}$ cents a pint. What was his gain?

LESSON XCVII.

1. Reduce $\frac{1}{77}$ of $\frac{11}{48}$ of 3 gallons to the fraction of a gill?
2. $\frac{1}{360}$ of $\frac{4}{5}$ of 2 weeks is what fraction of an hour?
3. Multiply the quotient of 132 divided by .22 by $1.96 \div 700$.
4. What must be the width of a pile of wood 16 ft. long and 8 ft. high, that contains 1600 cu. ft.?
5. If a nickel be placed upon every sq. in. of a city lot, 30 ft. by 125 ft., and also represent its value, how many nickels would be required, and what would be the value of the lot?

LESSON XCVIII.

1. *Make out* the following bill in proper form and receipt it:

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John Harvey bought of Amos Dow & Co., of Corinth, on March 14, 1881, the following:

9 pr. rubber boots,	@	$3.75
8 pr. calf boots,	"	6.40
25 pr. children's shoes,	"	1.10
30 pr. ladies' shoes,	"	3.16
27 pr. ladies' kid slippers,	"	1.85
19 pr. gaiters.	"	2.16

Received payment,

HENRY SMITH.

2. Reduce $\frac{1}{1000}$ of a long ton to drams.
3. What will it cost to calcimine the ceiling of a room 20 ft. by 15, at $1.10 per square of 100 feet?
4. What is the value of 8 loads of wheat, each containing 30 bu. 3 pk., at $.65 per bushel?
5. If the number of inhabitants of the United States amounts to 50,000,000, how long would it take to count them, counting at the rate of 10 a minute?

LESSON XCIX.

1. $\frac{1}{980}$ of a day is what fraction of a minute?
2. How many ounces is $\frac{1}{6400}$ of a ton?
3. At $.20 a sq. yard, what will be the cost of painting the outside of a house 35 ft. long, 23 ft. wide and 20 ft. from the foundation to the eaves?
4. At $7.50 a ton what will be the cost of 496 pounds of hay?
5. What will be the cost of three loads of oats, each weighing 31584 pounds, at 57 cents per bushel?

LESSON C.

1. Reduce $\frac{5}{8}$ of a penny to the fraction of a £.
2. What part of a shilling is $\frac{3}{4}$ of a farthing?
3. A boy bought 3 bushels of peanuts, dry measure, paying at the rate of 7 cents a quart, and retailed them so as to gain $2.88. What was his selling price per pint?
4. What part of $17\frac{1}{3}$ is $12\frac{1}{2}$?
5. If $4800 + 4800 cents + 5800 mills be paid for 40 horses, how many times will .875 be contained in the price of one horse?

LESSON CI.

1. Reduce $\frac{7}{8}$ of $\frac{14}{15}$ of a penny to the fraction of a guinea.
2. $\frac{1}{2}$ *of a grain is* what fraction of a pound Troy?

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3. At $4 a ream what will $\frac{1}{2}$ a quire of paper cost?
4. What will be the cost of building a stone wall 396 ft. long, 6 ft. high and 1 ft. 8 inches thick, at $1.00 a perch?
5. How many pounds of medicine will be required to put up daily 18 prescriptions of 20 gr. each, for the spring and summer months?

LESSON CII.

1. $1\frac{1}{2}$ of $\frac{7}{8\frac{3}{5}}$ of 4 pwt. is what part of a pound?
2. What part of an eagle is $\frac{1}{2}$ of a dime?
3. $.030 \times .002 \div .0005 \div .0004 \times 3.\frac{1}{4} = ?$
4. How many boxes one foot square, can be piled in a room 16 ft. long, 12 ft. wide and 8 ft. high?
5. A manufacturer pays each day to employees $111.52. He employs 30 men at the rate of $2\frac{1}{2}$ per day, 16 women at $1\frac{1}{4}$ per day; the remainder he pays to boys and girls, of which there is an equal number, the boys receiving $.63 each, and the girls $.55 each per day. How many of each are employed?

LESSON CIII.

1. Reduce $\frac{9}{11}$ of a scruple to the fraction of a pound.
2. $\frac{1}{2}$ of $\frac{7}{10}$ of 5 grains is what part of a pound avoirdupois?
3. What is the cost of 6284 pounds of ore at $3.84 per ton, and 840 pounds of hay at $9.50 per ton?
4. What is the freight on 4978 pounds of flour at $.75 per hundred pounds, and 23526 ft. of boards at $11.25 per M?
5. A man owning $\frac{3}{5}$ of a mill sold $\frac{2}{3}$ of his share for $4572. What is the value of the mill?

LESSON CIV.

1. What part of a pound is $\frac{3}{5}$ of $\frac{5}{8}$ of a dram?
2. What part of a ton is $\frac{1}{11}$ of an ounce?
3. Reduce $\frac{7}{9}$ of a £ to lower denominations.
4. Reduce $\frac{10}{11}$ of a pound to lower denominations.
5. A man having 4 tierces of 42 gal. each of lard filled from them 60 pails, of the capacity of 1 gallon each, 40 two quart pails, and 75 one quart pails. How much was there still remaining in the bulk?

LESSON CV.

1. Reduce $\frac{1}{12400}$ of a mile to the fraction of a foot.
2. *What part of* an inch is $\frac{1}{990}$ of a rod?

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Reduce $\frac{3}{5}$ of 1 lb. Troy, to lower denominations.
Reduce $\frac{1}{8}$ of 3 oz. Troy, to lower denominations.
A dealer bought 751 barrels of flour at $5 per barrel, and sold 400 barrels at a loss of $.25 a barrel; the remainder he sold at a profit sufficient to cover the loss. What did he receive per barrel for the remainder?

LESSON CVI.

Reduce $\frac{4}{5}$ of $\frac{3}{8}$ of a cwt. to its equivalent value in lower denominations.
Reduce $\frac{4}{7}$ of a week to integers.
How many bushels will a bin contain which is 16 ft. long, $9\frac{1}{2}$ ft wide and $6\frac{3}{4}$ ft. deep?
$(8 \div .0001 \div 4 \times 250) + (.4 \div .0000002 \div 5 \times 600) =$.
A dealer invested $7280 in hard and soft coal, buying an equal number of tons of each. He paid for the hard $5.85 per ton, and for the soft 3\frac{1}{4}$ per ton. How many tons of each did he buy?

LESSON CVII.

Reduce $\frac{7}{1760}$ of a hhd. to the fraction of a pint.
Reduce $\frac{6}{14}$ of 4 pwt. to the fraction of a pound.
Reduce $\frac{5}{7}$ of a mile to lower denominations.
What is the value of $\frac{3}{8}$ of an acre?
What is the cost of slating a roof 45 ft. long and each of the two sides 40 ft. wide, at 8\frac{1}{2}$ per square?

LESSON CVIII.

What is the value of $\frac{3}{5}$ of $4\frac{1}{4}$ acres?
What part of a mile is 133 rd. 1 yd. 2 ft.?
What part of 4 rods is 4 yards 2 feet?
At 3\frac{1}{4}$ per sq. yd. what will it cost to carpet a room 30 ft. by 24 ft.?
At $.35 a square of 100 feet, what is the cost of painting both sides of a fence 6 ft. high, which incloses a field 20 rods long and 250 ft. wide?

LESSON CIX.

Reduce $\frac{10}{11}$ of $\frac{11}{16}$ of a ton to lower denominations.
What part of 2 miles is 266 rd. 3 yd. 2 ft.?
What *part of £2 is 7s.* 6d.?

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4. Reduce $\frac{5}{8}$ of 4 rods to feet and inches.
5. How many bricks 12 in. long, 4 in. wide and 3 in. thick, will it take to build a wall 40 ft. long, 8 ft. high and 1 ft. in thickness?

LESSON CX.

1. Reduce $\frac{3}{5}$ of 4 gallons, wine measure, to quarts.
2. What is the value of $\frac{3}{4}$ of a lb. Troy, in lower denominations?
3. What part of 3 lb. Troy is 2 lb. 3 oz. ?
4. What part of 2 tons 3 cwt. is 15 cwt. 65 lb. ?
5. What will it cost to excavate a cellar $30\frac{1}{2}$ ft. long, 18 ft. wide and 9 ft. deep, at $\$.87\frac{1}{2}$ a cubic yard?

LESSON CXI.

1. Reduce 2 pk. 2 qt. to the fraction of a bushel.
2. What part of a £ is 14s. 8d. 2 far. ?
3. Reduce .115500 of a bushel to integers of lower denominations.
4. Reduce to lower denominations .44 of a hhd. of syrup?
5. At $\$.15$ a cu. ft. what will it cost to inclose a field 10 rods square, with a stone wall 6 ft. high and $1\frac{1}{2}$ ft. thick?

LESSON CXII.

1. Reduce $\frac{4}{1\,2\,9\,6}$ of a square yard to the fraction of a foot.
2. Reduce $\frac{7}{3\,6\,0}$ of a degree to integers.
3. Reduce .75 of a bale of paper to lower denominations?
4. Reduce .4156 cwt. to lower denominations?
5. How many more revolutions will the fore-wheel of a wagon make than the hind-wheel, in going a distance of $4\frac{3}{1\,1\,1}$ miles, the circumference of the fore-wheel being 15.5 ft. and the hind-wheel 16.8 ft.?

LESSON CXIII.

1. Reduce $\frac{4}{6}$ of $\frac{8}{1\,8}$ of a pound avoirdupois, to integers.
2. Reduce $\frac{2}{3}$ of a rod to the fraction of a league.
3. What part of 2 rods is 4 yards?
4. What is the value of .25 of a bbl. liquid measure in lower denominations?
5. *What part* of the diameter of the earth is 3240 miles, *expressed* decimally?

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LESSON CXIV.

1. How many acres are there in a field that is 240 rods long and 180 rods wide?
2. How many rods of fence does it require to inclose the above field and divide it into four equal lots?
3. What will it cost to plaster a room 33 ft. long, 30 ft. wide and 14 ft. high, at 18 cents a square yard?
4. What is the length of a telephone that cost $50000 at 10 cents a foot?
5. $.04\frac{1}{4} + .2\frac{3}{5} + 5.3\frac{4}{5} \div \frac{1}{100} = ?$

LESSON CXV.

1. Reduce 18 hours 15 min. 50.4 sec. to the decimal of a day.
2. What decimal of a £ is 10s. $1\frac{1}{2}$d.?
3. Reduce .0525 of a cwt. to integers of lower denominations.
4. How many yards of carpeting, one yard wide, are required to carpet a room 44 ft. long and 37 ft. wide?
5. A man bought 8 bushels of beans at $3 per bushel, and sold them at 5 cents per pint. What was his gain?

LESSON CXVI.

1. 32 rods is what decimal of a mile?
2. 4 inches is what decimal of a fathom?
3. 2 days 19 hours 12 minutes is what fraction of a week?
4. $.4\frac{1}{2} - .08\frac{1}{3} \div .50\frac{1}{4} = ?$
5. What is the cost of slating both sides of a roof 84 ft. long, each side 50 ft. wide, at $4.25 per square of 100 feet?

LESSON CXVII.

1. Reduce 48 lb. to the decimal of a long ton.
2. Reduce 2 qt. 5 gi. to the decimal of a gallon.
3. What is the value of .3625 of a lb. Troy?
4. What must $\frac{3}{4}$ of $1\frac{1}{2}$ be multiplied by to give a product of $5\frac{1}{2}$?
5. How many pieces, 6 in. by 4 in., can be cut from 16 sq. yd. of paper?

LESSON CXVIII.

1. Reduce 2 gallons .64 pt. to the decimal of a hhd.
2. Reduce 2 yd. 4.5 in. to the decimal of a rod.
3. 6 hr. 20 *min. is what* fraction of a leap year?

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4. What is the cost of 986 pounds of coal at $7.50 per ton?
5. At 20 cts. a sq. yd. what is the cost of plastering the walls and ceiling of a room 26 ft. by 22 ft. 3 in. and 18 ft. high?

LESSON CXIX.

1. 1 pk. 4.56 qt. is what decimal of a bushel?
2. Reduce 6 cd. ft. 12 cu. ft. to the decimal of a cord.
3. What is the value of 1.125 gallons in integers of lower denominations?
4. If $16\frac{1}{8}$ barrels of cranberries cost $\$65\frac{1}{4}$, what will $24\frac{1}{4}$ barrels cost?
5. At $7.50 per 1000 what will be the cost of 975 feet of spruce boards?

   What will be the cost of 1830 pounds of beef at $\$4.38\frac{1}{2}$ per hundred?

LESSON CXX.

1. Reduce 5 oz. 1 scruple to the decimal of a pound.
2. Reduce 2 gal. 1.64 pt. to the decimal of a hogshead.
3. 14 gal. 2 qt. 2 gi. is what fraction of 2 hhd.?
4. At $10\frac{1}{2}$ cents per foot what will it cost to curb a street $\frac{1}{4}$ of a mile long?
5. If 6 acres cost $87.00, how many acres can be bought for $21360?

   If $\frac{1}{8}$ of a lb. cost $\frac{5}{16}$ of a dollar, how many lb. can be bought for $280.84?

LESSON CXXI.

1. What is the sum of £36 14s. 7d., £73 9s. 10d., £95 17s. 11d., £48 16s. 4d. and £14 8s. 5d.?
2. Add 6 T. 15 cwt. 18 lb. 11 oz., 2 T. 7 cwt. 96 lb. 13 oz., 12 cwt. 48 lb. 10 oz. and 2 T. 45 lb.
3. Reduce $\frac{1}{35}$ of $\frac{5}{126}$ of a hogshead to the fraction of a pt.
4. At the rate of $1.80 per cord what would it cost to have a pile of wood sawed, that is 100 ft. long, 8 ft. wide and $5\frac{1}{2}$ ft. high?
5. If an engine should run $38\frac{1}{2}$ miles an hour, how many miles would it go in 4 days, allowing 3 hours a day for detentions?

LESSON CXXII.

Add 43 hhd. 27 gal. 3 qt. 2 pt., 110 hhd. 59 gal. 5 qt. 1 pt., *96 hhd. 50 gal.* 1 pt., 77 hhd. 49 gal. 2 qt. 3 pt., and 47 *hhd. 9 gal.* 2 qt. 1 pt.

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2. What is the sum of 20 yr. 102 da. 17 hr. 54 min. 38 sec., 17 yr. 312 da. 23 hr. 12 min. 45 sec., 4 yr. 63 da. 20 hr. 43 min. 40 sec., 12 yr. 108 da. 7 hr. 3 min. 10 sec. and 5 yr. 98 da. 11 hr. 27 min. 3 sec.?
3. Reduce $\frac{1}{8}$ of 9 pwt. to the fraction of a pound.
4. How much less is $6\frac{1}{4}$ times $96\frac{1}{2}$ than $7\frac{3}{5}$ times $95\frac{5}{8}$?
5. A, B and C share \$3600. A has $\frac{3}{8}$ + \$500, B has $\frac{3}{10}$ − \$100, and C the remainder. What is the share of each?

LESSON CXXIII.

1. What is the sum of 20 lb. 6 oz. 10 pwt. 10 gr., 15 lb. 4 oz. 9 pwt. 6 gr., 8 lb. 14 pwt. 12 gr. and 41 lb. 7 oz. 21 pwt. 2 gr.?
2. Find the sum of 4 bu. 4 pk. 6 qt. 1 pt., 5 bu. 3 pk. 7 qt. 1 pt., 8 bu. 3 pk. 5 qt., 3 bu. 2 pk. 5 qt. 1 pt. and 8 bu. 3 pk. 7 qt. 1 pt.
3. What is the value of $\frac{4}{5}$ of 17 cwt.?
4. Reduce 137 sq. rd. 15 sq. yd. 1 sq. ft. 18 sq. in. to the fraction of an acre.
5. How many sods, each 16 in. square, will be required to cover a yard 106 ft. 4 in. long and 56 ft. wide?

LESSON CXXIV.

1. Find the sum of 2 mi. 100 rd. 4 yd. 2 ft. 8 in., 7 mi. 340 rd. 1 yd. 2 ft. 7 in., 12 mi. 170 rd. 1 yd. 11 in., and 250 rd. 4 yd. 2 ft.
2. What is the sum of 160 sq. yd. 4 sq. ft. 100 sq. in., 160 sq. yd. 7 sq. ft. 125 sq. in., and 17 sq. yd. 7 sq. ft. 11 sq. in.?
3. 7 cwt. $82\frac{1}{2}$ lb. is what part of 1 ton $1\frac{1}{2}$ cwt.?
4. $40.01 - 3.3 - 1.009 \times 10000 \div .0002 =$?
5. If 20.25 cords of wood cost \$300, how many cords can be bought for \$1800?

LESSON CXXV.

1. Add 20 A. 140 P. 25 sq. yd. 8 sq. ft., 14 A. 100 P. 30 sq. yd. 8 sq. in., and 375 A. 50 P. 16 sq. yd. 7 sq. in.
2. What is the sum of $\frac{5}{8}$ of a ton and $\frac{1}{4}$ of a cwt.?
3. What will it cost, at 55 cents a sq. yd., to plaster a room 56 feet by 44 ft. 6 in. and 36 feet high?
4. How many bottles, of a capacity of $1\frac{1}{2}$ pints, are required to contain 2 barrels of wine?
5. $3 - .3 \times 30 + 300 \div .00003 \div 30 =$?

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LESSON CXXVI.

1. Find the sum of 10 bu. 3 pk. 6 qt. 1.8 pt., 8 bu. 2 pk. 4 qt. 1.1 pt., 7 bu. 3 qt. 1.4 pt., 5 bu. 7 qt. 1.3 pt., and 17 bu. 3 pk. 7 qt. 1.5 pt.
2. How many feet in $\frac{3}{8}$ of a chain $+\frac{5}{10}$ of a furlong?
3. Add $\frac{1}{2}$ of $\frac{3}{4}$ of a day to $\frac{1}{3}$ of $1\frac{1}{2}$ hours.
4. Reduce 1.53508 of a sq. mile to integers of lower denominations.
5. What is the freight on 4978 pounds of iron bars, at $.75 per M?
   At $9 per ton what will 9280 pounds of hay cost?

LESSON CXXVII.

1. From 25 gal. 2 qt. 1 pt. 3 gi. take 8 gal. 1 pt. 2 gi.
2. £6 6s. $8\frac{1}{2}$d. — £5 11s. $5\frac{1}{2}$d. = ?
3. Add $\frac{3}{4}$ lb. Troy, $\frac{1}{2}$ oz. and $\frac{1}{4}$ pwt.
4. How many boards 14 ft. long would be required to fence a field 56 rods by 28 rods, the fence to be 3 boards high?
5. A man owned $\frac{4}{7}$ of a farm and sold $\frac{3}{5}$ of his share; his remaining interest was valued at $2685.84. What was the value of the entire farm?

LESSON CXXVIII.

1. From 22 ch. 7 l. 4 in. take 15 ch. 14 l. $4\frac{1}{4}$ in.
2. From 16 cd. 6 cd. ft. take 12 cd. $12\frac{3}{8}$ cu. ft.
3. Find the sum of $\frac{3}{5}$ cwt. $\frac{4}{25}$ lb. and $\frac{3}{8}$ oz.
4. What part of 1 bu. 1 pk. 2 qt. is 1 pk. 7 qt. $1\frac{1}{2}$ pt.?
5. I paid $9\frac{1}{2}$ cents a pound for $4\frac{1}{2}$ tons of cheese, and sold it for $1080. What was the selling price per pound and the entire gain?

LESSON CXXIX.

1. Add $\frac{3}{5}$ mi. $\frac{5}{8}$ fur. $\frac{1}{4}$ ft.
2. From 275 mi. take 50 mi. 130 rd. 3 yd. 1 ft. 3 in.
3. Find the difference in the longitude of two places, one 80° 30′ 28″ west, and the other 45° 17′ 40″ west.
4. Reduce $\frac{1}{1860}$ of a hhd. to the fraction of a pint.
   Reduce $\frac{4}{5}$ of 3 pwt. to the fraction of a pound.
5. What will be the cost of $24\frac{5}{14}$ yd. of cloth, at $\frac{3}{4}$ of $5\frac{2}{3}$ per yard?
   I have $345\frac{1}{3}$ cords of wood and sell $148\frac{3}{4}$ cords. What is the *remainder* worth at $8.50 per cord?

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LESSON CXXX.

1. From £4 3s. 10¼d. take £2 13s. 6¾d.
2. From 6 mi. 5 fur. 20 rd. 1 ft. 8 in. take 4 mi. 6 fur. 21 rd. 1 yd.
3. Add $\frac{4}{7}$ A. and $\frac{3}{4}$ of 2 sq. rods.
4. A man purchased a farm for $3282½ paying $15⅜ an acre. What does he receive for the farm by selling it at an advance of $17 per acre?
5. $\frac{3}{4}$ of $\frac{8}{9}$ of $\frac{4}{5} \div \frac{7}{8}$ of $\frac{1}{14}$ of $\frac{7}{21} = ?$
   Divide 18½ times 327½ by $\frac{7}{16}$.

LESSON CXXXI.

1. A grocer having on hand 16 cwt. 75 lb. of sugar, buys 4 cwt. 65 lb. more, and then sells 12 cwt. 95 lb. 14 oz. How much has he remaining?
2. From 1845 yr. 9 mo. 18 da. 20 hr. take 1774 yr. 11 mo. 20 da. 22½ hr.
3. $\frac{5}{6}$ of an ounce avoirdupois is $\frac{3}{4}$ of what fraction of 3 pounds?
4. How many thousand bricks in a pile 12 feet long 8 feet wide and 3 feet high, each brick containing 64 cubic inches?
5. St. Louis, March 4, 1882.

Mr. S. P. Hunt,

	B't of J. M. Stone,	
87 yd. carpeting,	@ $1.75	$
55 yd. drugget,	" 1.87½	
4 rugs,	" 25.40	
36 yd. of oil-cloth,	" .95	
		$
Cr. By cash,	$150	
" groceries,	50	

Balance,

Received payment,

LESSON CXXXII.

1. How many years, months and days from the birth of George Washington, Feb. 22, 1732, to the death of James A. Garfield, Sept. 19, 1881?
2. From 1 ton take 13 cwt. 20 lb. 7 oz.
   From 1 *lb. apothecaries* take 6 ℥ 3 ℨ 2 ℈ 13 gr.

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3. I paid $720 for 4 tons of cheese, and retailed it at $.15½ per pound. What was my gain?
   What will 1 T. 10 cwt. 25 lb. of tobacco cost at 20 cents a pound?
4. 40.1 − 39.7 × .4 ÷ .0008 = ?
5. $1000 will buy how many car-loads of oats, each car-load to contain 300 bu., each bushel to weigh 32 pounds, and each pound worth ¼ of a cent?

LESSON CXXXIII.

1. How many years, months, and days from the Declaration of Independence July 4, 1776, to the present time?
2. The latitude of Chicago is 41° 31′ 3″ north and Rio Janeiro 33° 20′ 20″ south. What is the difference in latitude between the two places?
3. Add ⅛ fur. ½ rd. ⅔ yd.
4. From 4° 9′ 11″ take 2° 30′ 20″.
   5 lb. 4 oz. 14 pwt. 13 gr. — 3 lb. 6 oz. 18 pwt. 14 gr. = ?
5. What is the cost of 7 gal. 3 qt. 1 pt. of wine at $7.75 per gallon?

LESSON CXXXIV.

1. Napoleon was born Aug. 15, 1769. How old was he when the battle of Waterloo was fought, June 18, 1815?
2. From 1 lb. avoirdupois take 14 oz. 15 dr.
   From 12 cu. yd. 840 cu. in. take 9 cu. yd. 17 cu. ft. 1624¾ cu. in.
3. Change $\frac{1}{15}$ to a decimal and divide the result by 2500.
   $3.125 \div 15\frac{5}{8} \times .09 \times 1000 - 24$ ten-thousandths = ?
4. What is the distance around and the area of a field 80.5 rods long and 24.4 rods wide?
5. A daily newspaper has a circulation of 50000 copies. Allowing 2 sheets to a number, how many bales will be required for its publication for one year?

LESSON CXXXV.

1. A note dated December 27, 1879, was paid January 4, 1881. How long had it run?
2. Add ⅛ fur. ⅝ rd. $\frac{3}{11}$ yd. $\frac{7}{12}$ in.
3. What is the cost of 6 T. 17 cwt. 25 lb. of hay, at $12 a ton?
4. .63 of a farm is mortgaged for $18900, which is its full value. *What is the* farm worth?

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5. James took $\frac{3}{5}$ of a sum of money, and John the remainder, which was $2480. Peter had twice as much as both the others. What decimal of Peter's money is John's?

LESSON CXXXVI.

1. From $\frac{3}{5}$ oz. take $\frac{4}{5}$ pwt.
   From .1875 da. take .2 min.
2. From $\frac{2}{3}$ hhd. take $\frac{3}{4}$ qt.
   From .64 lb. take .7 $\frac{5}{7}$.
3. How much wood is there in three piles containing respectively, 12 cd. 6 cd. ft. 10 cu. ft., 14 cd. 34 cu. ft., and 27 cd. 7 cd. ft. 9$\frac{1}{2}$ cu. ft.?
4. What is the smallest sum of money for which I can purchase an exact number of bushels of potatoes at $.75 a bushel, or turnips at $.60 a bu., or onions at $.90 a bu.?
5. How pounds of sugar, at $.10$\frac{1}{2}$ per pound, will be required to pay for 3 cwt. 78 lb. of lard at $.12$\frac{1}{2}$ per lb.?

LESSON CXXXVII.

1. From $\frac{1}{6}$ of a week take $\frac{1}{6}$ of a day.
   Find the difference between $\frac{1}{3}$ of a rod and $\frac{2}{3}$ of a foot.
2. What is the sum of $\frac{3}{5}$ cwt. 88$\frac{4}{7}$ lb., 1 cwt. 14$\frac{1}{4}$ oz. by long ton table?
3. What length of time will elapse from 25 minutes past 3 o'clock, P. M., May 27, 1875, to 20 minutes before 10 o'clock, A. M., January 7, 1881?
4. What will it cost to plaster the walls and ceiling of a room 54 ft. by 36 ft. and 22$\frac{1}{2}$ ft. high, at $.45 a sq. yd., allowing 972 sq. ft. for doors and windows?
5. Reduce to common fractions and add .0048, 24.25$\frac{1}{2}$, 224.00$\frac{4}{5}$, .08$\frac{1}{3}$, 20$\frac{7}{16}$.

LESSON CXXXVIII.

1. From $\frac{4}{5}$ of a ton take $\frac{6}{17}$ of a cwt.
2. From $\frac{7}{8}$ of a mile take $\frac{7}{18}$ of a rod.
3. What is the sum of 9$\frac{4}{7}$ cwt. 10 oz. and 9$\frac{3}{7}$ lb.?
4. A farmer wishes to put into the largest bags, of equal size that will exactly contain each kind, 411 bu. of wheat, 327 bu. of oats and 519 bu. of corn. How many bags will be required?
5. $8.005 \times .016 \div .008 - 4.01 \times .0024 \div .000003 = ?$

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LESSON CXXXIX.

1. Take 2 da. 14.506 hr. from a solar yr.
2. From $\frac{3}{10}$ A. take $\frac{2}{5}$ sq. rd.
3. Add $\frac{1}{7}$ of a ton, $\frac{1}{8}$ of a ton and $\frac{1}{4}$ of a cwt.
4. What is the cost of painting both sides of a fence four feet high, that incloses a lot 32 rods long and 100 yards wide, at $1.25 per square of 100 ft.?
5. What is the cost of plastering the walls and ceiling of a room 30 ft. long by 24 ft. wide and 12 ft. high, at 20$\frac{1}{2}$ cents per sq. yard?

LESSON CXL.

1. Add .118 lb. .52 oz. 9.88 pwt. and .025 gr.
2. From $\frac{3}{5}$ of an oz. take $\frac{7}{8}$ of a pwt.
3. From $\frac{1}{24}$ of a mile take $\frac{1}{6}$ of a furlong.
4. Of a certain tract of land, A owns 350 sq. rd., B 300 sq. rd., and C 250 sq. rd. They agree to divide it into equal lots of the largest size, that will allow each to form an exact number. What will be the width of the lots, if it is $\frac{1}{2}$ the depth?
5. Reduce to common fractions in lowest terms, .03125 and .1055.

LESSON CXLI.

1. From $\frac{4}{5}$ of 19$\frac{1}{4}$ gallons take $\frac{1}{2}$ of 7$\frac{3}{5}$ qt.
2. To $\frac{3}{8}$ of 20$\frac{1}{2}$ yards add $\frac{4}{5}$ of 9$\frac{1}{4}$ yards.
3. A man having 10 barrels of vinegar sold 1$\frac{2}{3}$ barrels for $11, and the remainder at 30 cents a gallon. How much did he receive for it?
4. A merchant has 4 bolts of ribbon containing 21$\frac{1}{2}$, 19$\frac{1}{2}$, 25 and 13$\frac{1}{2}$ yards. What is it all worth at 55 cents a yard?
5. What is the cost of 9876 ft. of boards at $15.75 per M? What is the cost of 8753 pounds of beef at $4.75 per C?

LESSON CXLII.

1. Multiply 5 gal. 2 qt. 1 pt. 3 gi. by 12.
2. Multiply £15 14s. 7d. 3 far. by 42.
3. I bought by the long ton 48 T. 7 cwt. 1 qr. 19 lb. of cutlery, and sold 37 T. 9 cwt. 2 qr. 10 lb. What quantity remained unsold?
4. A can excavate 9 cu. yd., B 6 cu. yd. and C 8 cu. yd. in a

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day. What is the smallest number of cubic yards that will make even day's works for the three?

5. Three persons commenced business. A furnished $\frac{1}{3}$ of the capital, B $\frac{2}{5}$ of it and C the remainder; at the close of the year they had gained \$10080. What was the share of each?

LESSON CXLIII.

1. Multiply 7 lb. 9 oz. 14 pwt. 17 gr. by 63.
2. Multiply 4 sq. mi. 95 sq. rd. 14 sq. ft. by 40.
3. How much coal is there in three piles, the first of which contains 680 T. 460 lb., the second 453 T. 18 cwt. 98 lb., and the third 270 T. 16 cwt. 78 lb.?
4. What is the cost of 6284 pounds of plaster at \$4.50 per ton? At \$10 a ton what will 1358 pounds of hay cost?
5. The covering of a pile of wood is 48 ft. by 36 ft. and 10 feet from the ground. What is the value of the wood at \$5.50 per cord?

LESSON CXLIV.

1. How much sugar in 24 hogsheads, each containing 10 cwt. 75 lb. 8 oz.?
2. What will be the weight of 10 silver cups, each weighing 6 oz. 12 pwt. 15 gr.?
3. From $\frac{3}{11}$ of a bushel take $\frac{1}{16}$ of a peck.
4. A man owning 4 tracts of land, containing respectively 115, 85, 100 and 45 acres, wishes to divide them into the largest fields of equal size that will allow an exact division of each tract. How many fields can he make?
5. At \$1.75 a yard and $\frac{7}{8}$ of a yard wide what will it cost to carpet a room 29.25 ft. long and 18.9 ft. wide?

LESSON CXLV.

1. A house has 8 rooms whose floors average 1 sq. rd. 57 sq. ft. 55 sq. inches. What is the entire floor surface?
2. How much land in 12 fields, each containing 106 A. 9 sq. rd. 17 sq. yards?
3. From a hogshead containing 75 gallons $\frac{3}{11}$ leaked out, and I sold $\frac{2}{7}$ of it. How much remained?
4. A man spends \$8.75 a week and earns \$2$\frac{1}{2}$ a day, Sundays excepted. How much can he save in the first half of the year?
5. $2\frac{1}{4} - \frac{3}{5} \times \frac{4}{55} \div \frac{1}{1000} = ?$

Change $\frac{1}{5760}$ *lb. Troy to grains.*

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LESSON CXLVI.

1. Multiply 42 cd. 7 cd. ft. 14 cu. ft. 1428 cu. in. by 24.
2. What is the value of 8 loads of potatoes, each containing 30 bu. 3 pk., at $.55 per bushel?
3. What is the smallest sum of money with which I can purchase turkeys at $1.25 each, or geese at $.75 each, or ducks at $.45 each?
4. What is the difference in the longitude of two places, one being 78° 25′ 30″ west and the other 70° 18′ 45″ west?
5. Make out in proper form and receipt the following bill of goods:

   Mr. J. M. Granes bought of H. C. Newton 20 reams of commercial note at $2.25 a ream, 6500 envelopes at $4.64 per M, 20 gross steel pens at $.75 per gross, 48 French Histories at $1.90 each, 288 bottles ink at $10.80 per gross.

LESSON CXLVII.

1. Multiply the sum of 18 sq. rd. 4 sq. ft. 2.92 sq. in. and 40 sq. rd. 18 sq. ft. 7.08 sq. in. by 42.
2. If 5 farms, each containing 50 A. 95 sq. rd. 15¼ sq. yd., are taken from a square mile, how much remains?
3. How much less is ⅛ of a quart than ⅔ of a hogshead?
   Reduce ⅞ of 18 cwt. to its equivalent value.
4. I paid $336 for corn at 40 cents a bushel, and sold ⅓ of it at an advance of 5 cents a bushel, and the remainder so that my entire gain was $70. What was the last selling price per bu.?
5. How many times can a vessel of a capacity of 1 gal. 1 qt. 1 pt. be filled from 1 hhd. 14 gal.?

LESSON CXLVIII.

1. Divide £247 6s. 1d. by 7.
   Divide 689 lb. 8 oz. 16 pwt. by 56.
2. Divide 14778 mi. 1 fur. 32 rd. by 84.
   Divide 8962 bu. 16 qt. by 60.
3. If from 122 gal. 2 qt. 1 pt. of wine were filled 24 demijohns, each containing 1 gal. 1 pt., how much wine would remain?
4. At 1 cent a pound what would be the value of the contents of an ice-house 70 ft. by 45 ft. and 15 ft. in height, allowing 35 pounds to a cu. ft.?

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5. How many barrels of water will a cistern hold that is 12 ft. long, 8 ft. wide and 12½ feet high?

LESSON CXLIX.

1. How many pounds of sugar in 20 barrels, each containing 2 cwt. 47 lb.?
2. How many lb. of sugar, at 9 cents per pound, must be given for 2 cwt. 43 lb. of pork at 6 cents per pound?
3. Divide 5 da. 7 hr. 36 min. 8 sec. into 7 equal parts.
4. How much must I give for paving a walk 601 ft. 6 in. long and 16 ft. 8 in. wide at $1¼ per 100 sq. feet?
5. What will it cost to paint the walls of a room 54¾ ft. long, 36 feet wide and 10¼ ft. high at 90 cents per sq. yd.?

LESSON CL.

1. Divide 1199 yr. 9 mo. 3 wk. 1 da. by 17.
2. Divide 3039 hhd. 39 gal. 1 qt. 1 pt. by 63.
3. Multiply 83 mi. 2 fur. 26 rd. 11 ft. by 12.
4. How much will it cost to pave a walk 89⅝ ft. long and 9½ ft. wide at $2.50 per 100 sq. ft.?
5. If ⅛ of a farm is sold for $17000 what are 2⅞ such farms worth?

LESSON CLI.

1. Divide £507 16s. 3d. by 15.
2. Divide 96350 C. 50 cu. ft. by 65.
3. Multiply 1° 48′ 41½″ by 25.
4. From ⅝ A. take ¼ of 120 rods.
   From ⅓ hhd. take ⅝ of a quart.
5. $(.04\frac{1}{4}+.5+.06\frac{3}{8}+.0\frac{1}{2}+.000\frac{1}{3}+3.00\frac{3}{4})\times\frac{1}{3}=?$

LESSON CLII

1. Divide 1 da. 11 hr. 58 min. 56 sec. by 44.
2. Divide 1 pk. 1 qt. 1 pt. 2 gi. by 8.
3. From ⅔ of 9⅝ gallons take ¼ of $1\frac{2}{10}$ quarts.
4. If 75⅜ tons of coal cost $678⅜, what will 25¾ tons cost if each ton of the latter is worth one-half more than one of the former?
5. I bought 4 hogsheads of molasses at 42 cents per gallon, and sold it for $157.50. What was my gain and what was the selling price per gallon?

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LESSON CLIII.

1. What is the quotient of 7821 A. 20 sq. rd. divided by 22?
2. Divide 36 C. 74 cu. ft. 944 cu. in. by 40.
3. How much time would be required to count $10000, 90 dimes, 50 cents and 60 mills, counting at the rate of 3 cents a second and 12 hours a day?
4. A owns 32 acres 13 sq. rd. 20¼ sq. yd., B owns 580 acres 58 sq. rd., C owns 400 acres 90 sq. rd. 10 sq. yd. How much do they all own?
5. If, at 12 cents per ft., the Atlantic cable cost $2027520, what is its length in miles?

LESSON CLIV.

1. Divide 12783 da. 11 hr. 28 min. by 35.
2. Divide 15891° 13′ 30″ by 70.
3. Two persons, A and B, are 240 miles apart and travel toward each other. After A travels ⅓ and B ⅘ of the distance how far apart are they?
4. Reduce ⅘ of 1 cwt. to integers of lower denominations. What part of £3 5s. 6d. 1 far. is £2 1s. 3d.?
5. How many sq. yd. of plastering are there in a room 36 ft. by 22½ ft. and 10 ft. high, allowing for 2 doors, each 7 ft. by 3 ft., and 2 windows, each 6 ft. by 2½ ft.?

LESSON CLV.

1. If Boston is 71° 3′ and Chicago 87° 30′ west longitude, what is the difference in time?
2. Halifax is 63° 36′ and Cincinnati 84° 24′ west longitude; what is the difference in time?
3. How many times are 5 gal. 2 qt. 1 pt. contained in 7 hhd. 25 gal. 3 qt. 1 pt.?
4. Divide 30 thousandths by five millionths, and that quotient by three ten-thousandths.
5. I received $127.68 from the sale of nuts at 9½ cents per qt. How many bags of a capacity of 3½ bu. were required to contain them?

LESSON CLVI.

1. Washington is 77° 1′ and the city of Mexico is 99° 5′ west longitude. What is the difference in time?
2. If Eastport, Me., is 67° and San Francisco is 122° west longitude, what is the difference in time?

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The aggregate weight of 113 hogsheads of sugar is 50 T. 13 cwt. 4 lb. 8 oz. What is the average weight per hogshead?

If .9 of .75 of a farm is worth $5278.50 at $20 an acre, how many acres are there in the farm?

What will it cost to plaster the walls and ceiling of a room 36 ft. by 18½ ft. and 14 feet high, after deducting ⅛ of the surface for doors and windows, at $.54 a sq. yd.?

LESSON CLVII.

St. Louis is 90° 15′ and Boston 71° 3′ west longitude. What is their difference in time?

Astoria, Oregon, is 124° and New York 70° 1′ west longitude. What is their difference in time?

How many times are £1 1s. 1d. contained in £1075 1s. 8d.?

What is the cost of 10 T. 17 cwt. 20 lb. of hay at $17.50 per ton?

If 17½ tons of coal cost $150, what amount may be bought for $200?

LESSON CLVIII.

Eastport, Maine, is 67° and Washington 77° 1′ west longitude. What is their difference in time?

New York is 70° 1′ west and St. Petersburg 30° 19′ east longitude. What is their difference in time?

Divide 403 T. 17 cwt. 55 lb. by 25.

$(\frac{2}{3}+\frac{3}{5})\times\frac{3}{4}\div(\frac{3}{4}-\frac{2}{5})\times\frac{1}{4}=?$

A pile of wood at $10 per cord costs $750; it is 8 ft. high and 4 ft. wide. How long is it?

LESSON CLIX.

Pekin is 118° east and Halifax 63° 36′ west longitude. What is their difference in time?

Cape Good Hope is 18° 28′ east and Chicago 87° 30′ west longitude. What is their difference in time?

Multiply 214 mi. 2 fur. 27 r. by 14.

If $28.90 will pay for 25 bu. of wheat, what quantity can be bought for $110.39½?

What will it cost to pave a block 60 feet between curbing *and 48 rods long, at* $2.25 a square yard?

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LESSON CLX.

1. The difference of time between Boston and Cincinnati is 53 min. 32 sec. What is the difference in longitude?
2. London is 0° and the Sandwich Islands 155° west longitude. What is their difference in time?
3. What will it cost to plaster a hall 36 feet long, 30 ft. wide and 22 ft. high, at $.40 per sq. yard?
4. $4.503 \times .002 \div 3.002 + 6.007 - .416 = ?$
5. A man bought 25.5 hogsheads of wine at $3.15 per gallon, and retailed it at 40 cents a pint. How much did he gain?

LESSON CLXI.

1. What is the difference in longitude between two places whose difference in time is 10 hr. 34 min. 45 sec.?
2. What is the difference in longitude between two places whose difference in time is 2 hr. 53 min. 52 sec.?
3. If Naples is 14° 15′ east longitude, and St. Louis 90° 15′ west longitude, what is their difference in time?
4. How much wood is there in three piles containing respectively 12 cd. 6 cd. ft. 10 cu. ft., 14 cd. 34 cu. ft., and 27 cd. 7 cd. ft. 9½ cu. ft.?
5. A, B and C divide 445⅙ bu. of corn among themselves, A taking ⅜ of it, B 128¼ bushels, and C the remainder. How many bushels had each?

LESSON CLXII.

1. The difference in time between Washington and St. Petersburg is 7 hr. 9 min. 20 sec. What is their difference in longitude?
2. If Pekin is 118° east longitude and Washington 77° 1′ west longitude, what is their difference in time?
3. How many cubic ft. in the hold of a ship which contains 2000 bushels of grain?
4. If one horse eat 3 pk. 1 qt. of oats in one day, in how many days would 4 horses eat 200 bushels?
5. I bought 450 sheep at $4.50 per head; ⅓ of them were sold at a loss of 20 ct. a head, and enough was gained on the sale *of the* remainder to exactly cover the loss. What was the *selling price* of the remainder per head?

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LESSON CLXIII.

. When it is 2 A. M. at the Sandwich Islands, 155° west longitude, what time is it at Baltimore, 76° 37′ west longitude?
. The difference in time between New York and Canton is 11 hr. 31 min. 48 sec. What is their difference in longitude?
. A note was given August 25, 1875, and renewed February 6, 1879, to run 3 times as long as the first agreement. What length of time had it to run?
. The top of a reservoir is 16 ft. 6 in. square and it is 9 ft. deep. How many hhd. will it contain?
. How many bricks will be required to build a wall 6 ft. high around 3 sides of a yard 2 rods square, the width of the wall to be twice the length of a brick?

LESSON CLXIV.

. A steamer arrives at San Francisco, 122° west longitude, at 1 P. M. If the fact be telegraphed to Chicago without loss of time, what will be the time of its receipt in Chicago?
. $3 \div 18\frac{3}{4} \times 200 - 5$ thousandths $\times 2000 \div 24 = ?$
$8.4 \div 62\frac{1}{2} \times .09 \times 1000 - 9$ tenths $\div .06 = ?$
. If 20 sections of land be divided into 135 farms of equal size, what will be the size of each farm?
. What is the entire length of 4 fields measuring respectively 20 rd. 43 ft. 7 in., 36 rd. 14 ft. 5 in., 28.27 rd. and 7 rd. 3 in.?
. A cellar 60 ft. long, 44 ft. wide and 6 ft. deep was excavated by 8 men in 6 days, working 10 hr. a day. What was the amount excavated by each man in an hour?

LESSON CLXV.

. The difference in time between the Sandwich Islands and Cincinnati is 4 hr. 42 min. 24 sec. What is their difference in longitude?
. The difference in time between the Cape of Good Hope and Pekin is 6 hr. 38 min. 8 sec. What is their difference in longitude?
. The difference in longitude between London and Chicago is 87° 30′. When it is 9 o'clock A. M. in London, what time is it in Chicago?
. I agree to *give a man* $32 for carting 23 T. 1 cwt. 40 lb. of

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hay, and he carts only 7 T. 13 cwt. 80 lb. How much money ought he to have?

5. A man has 1313 bushels of wheat and 4108 bushels of oats, which he wishes to put into the fewest bins of equal size that will exactly hold either kind of grain? How many bins will he need?

LESSON CLXVI.

1. If a message is sent without loss of time, at 12 o'clock M. from Washington, 77° 1′ west, to New York, 74° 1′ west, what is the time of its arrival at New York?
2. The difference in time between Washington and San Francisco is 2 hr. 59 min. 56 sec. What is their difference in longitude?
3. $.803 + .007302 + .8001 \times .03 \div .0109 = ?$
4. $4\frac{1}{2} + 5\frac{3}{4} - 7\frac{1}{2} \div 2\frac{3}{5} = ?$
   $8\frac{9}{10} - 5\frac{3}{5} - 1\frac{1}{4} \times 6\frac{1}{2} \times \frac{1}{2} \times \frac{4}{7} = ?$
5. How many yards of carpeting, $\frac{3}{4}$ of a yard wide, will it take to cover a floor 36 ft. long and 30 ft. wide?

INTEREST.

NOTE.—A short and correct method of computing interest is by the following rule:

Place the principal, rate per cent. expressed decimally, and the time in months and fraction of a month above the line for the numerator of a fraction, and 12 below the line for the denominator; then proceed as in cancellation. If there is a fraction in the numerator, consider the whole as a complex fraction and solve accordingly. As the division is the last process an exact answer is obtained.

1. What is the interest of $300.50 for 1 yr. 6 mo. at 6 per cent.?
2. What is the interest of $48.30 for 1 yr. 1 mo. at 6 per cent.?
3. Required the interest of $420.01 for 4 mo. 3 da. at 6 per cent.
4. Required the interest of $5384 for 6 yr. 3 mo. 24 da. at 8 per cent.
5. What is the interest of $860.75 for 1 yr. 8 mo. 21 da. at 10 per cent.?
6. What is the interest of $22.57 for 9 mo. 15 da. at 5 per cent.?
7. What is the interest of $48.10 for 3 yr. 11 mo. at 12 per cent.?

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8. Required the interest of $875.37 for 2 yr. 10 . per cent.
9. Required the interest of $4680.52 for 4 yr. 6 mo. per cent.
10. What is the interest of $6000 for 1 yr. 3 mo. 2 per cent.?
11. What is the interest of $846 for 2 years at 7 per cent.?
12. What is the interest of $950.70 for 9 mo. at 6 per cent.?
13. What is the interest of $720.93 for 3 years at 6 per cent.?
14. What is the interest of $432.40 for 4 yr. 4 mo. at 4 per cent.?
15. What is the interest of $320.80 for 2 years 6 months at 5 per cent.?
16. What is the interest of $863.70 for 1 year 4 months 20 days at 6 per cent.?
17. What is the interest of $580.20 for 2 years 4 months 15 days at 4½ per cent.?
18. At 8 per cent. what is the interest of $1480.20 for 2 years 7 months and 12 days?
19. At 9½ per cent. what is the interest of $9860 for 2 years 5 months and 12 days?
20. At 7½ per cent. what is the interest of $8640 for 2 years 11 months and 13 days?
21. What is the interest of $7640.80 for 3 years 9 months and 16 days at 5¼ per cent.?
22. What is the interest of $7693.30 for 1 year 10 months and 18 days at 6¾ per cent.?
23. At 6¼ per cent. what is the interest of $7966.60 for 4 years 3 months and 17 days?
24. What is the interest of $7840.40 for 3 years 7 months and 11 days at 7½ per cent.?

METRIC SYSTEM.

The entire Metric System is contained in a single sentence. Measure all lengths in meters, all capacities in liters and all weights in grams, using decimal fractions only, and saying deci for tenth, centi for hundredth, milli for thousandth, deka for ten, hekto for hundred, kilo for thousand and myra for ten thousand.

Teach that the Metric Tables have the same scale as the table of United States Money, and differ from other tables in that respect.

Call *attention to the* dollar as the base or primary unit, and

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the dime, cent and mill as the $\frac{1}{10}$, $\frac{1}{100}$, $\frac{1}{1000}$ part of a dollar, just as one decimeter is $\frac{1}{10}$ meter, one centimeter is $\frac{1}{100}$ meter, and one millimeter is $\frac{1}{1000}$ meter.

After a thorough drill in Linear Measure take other tables in the same way.

LINEAR MEASURE.

1. Write 8 Mm. 5 Hm. 9 m. and 5 cm. as millimeters.
2. What is the value of 6 Mm. 5 Hm. 8 Dm. 3 m. 6 cm. and 9 mm. in cm. ?
3. Reduce 356384 millimeters to Dm.; to Km.
4. Read the several orders in 5502.025 meters as metric units.
5. Reduce 83714 mm. to dm.; to Dm.
6. Express 4237625 cm. in Km. Dm. and dm.
7. Write 45 Mm. 228 Dm. and 302 mm. in meters.
8. Write 382 Km. 426 cm. as Dm.; as Km.
9. Express 236254.3 centimeters in Km. Dm. and cm.
10. Add four meters, three decimeters, seven dekameters, 7 centimeters, 6 millimeters.
11. Add three thousand kilometers, four thousand meters, eight thousand centimeters, four thousand millimeters, eight thousand hektometers.
12. What is the difference in kilometers between 238.38 m. and 31408.7 dm. ?
13. Subtract 9 Km. 6 Hm. 8 m. 7 dm. 4 mm. from 9 Km. 7 Hm. 2 Dm. 3 m. 5 cm. 4 mm. and express the result in decimeters.
14. Multiply 2735.38 m. by 246 and express in Hm.
15. Write the product of 2.5883 Km. $\times$ 2.0054 in the different denominations.
16. Divide 9 Dm. 7 m. 4 dm. 3 cm. 5 mm. by .005 and give the quotient in kilometers.
17. What denominations in the quotient of 2328 Dm. divided by 48.5 ?
18. What is the quotient, in meters, of 2 Hm. 6 m. 8 dm. 4 cm. 4 mm. $\div$ 12 ?
19. Divide the difference between 1486 Hm. and 5436 Dm. by 8.
20. If a man at one step measures 1 dm. 1 cm., how many will he take in measuring 5 Km. 8 dm. 2 m. ?

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MEASURES OF CAPACITY.

1. Reduce 8 l. to cl.; 7.1 Hl. to dl.
2. Write 68 Hl. 9 l. 4.5 cl.
3. Express 47309.562 l. in the several denominations.
4. Reduce 5 Kl. 3 Dl. 1 l. 4 cl. 9 ml. to Hl.
5. In 4162 cl. how many Dl. ?
In 623152 ml. how many dl. ?
6. Reduce 9.248 cu. meters to cu. decimeters and give the answer in denominations of capacity.
7. Add 7 Hl. 5 Dl. 7 dl., 3 Kl. 4 Dl. 7 l. 6 dl., 5 Dl. 7 dl. 9 ml., 6 l. 4 dl. 4 ml.
8. Find the difference between 3 cu. meters, and 9 dekaliters, and write the answer in liters.
9. How many liters in the difference between 6 cu. meters, and 92 hektoliters ?
10. Multiply the difference between 7 Hl. 9 l. 4 cl. and 8 Dl. 4 l. 6 ml. by 5, and give the answer in liters.

TABLE OF WEIGHTS.

1. Reduce 6.343 quintals to grams.
2. How many grams in 5 kilograms, 7 decagrams, 4 centigrams ?
3. Add 15 g. 6 dg. 42 kg. 8 tons and 7 mg.
4. Find the difference between 6 tons 8 Mg. 7 Dg. 5 cg. and 9 quintals 4 Kg. 7 Hg. 9 g. 7 cg.
5. What is the value of 653382 cg. in Mg. ?
What is the value of 36253 dg. in Kg. ?
6. Multiply 146 Kg. 7 Hg. 9 Dg. 4 g. by 6, and write the product in Dg.
7. From the sum of 43.62 Q. and 6300 Dg., take 3620 Hg. and write the result in Dg.
8. Give the product of (3662 mg. —23.2 dg.) by 6, in denominations.
9. What is the value of (346 dg. $\times 53$) + (426.3 g. $\div 21$).
10. A druggist buys 2 Hg. of camphor for 40 dollars and sells it at 4 cents per dg. What does he gain on the whole ?

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PROMISCUOUS EXAMPLES.

1. $2\frac{1}{2} \times \frac{7}{10} \times 3\frac{1}{3} \times \frac{7}{9} \times \frac{6}{17} \times 4\frac{1}{2} \times \frac{1}{2} = ?$

2. $\frac{\frac{3}{4}+\frac{1}{5}+\frac{1}{20}}{\frac{6}{7} \div \frac{11}{21}} \div 2\frac{3}{4}$ equals what decimal?

3. Reduce $\frac{3}{160}$ and $\frac{3}{125}$ to decimals and add.

4. If 50 acres of land cost $350, what will 63 acres cost at the same rate?

5. What is the cost of 763 ft. of timber at $7.20 per 1000 ft., and 5680 ft. of boards at $17.20 per 100 feet?

6. At $16 a ton what will 1840 lb. of hay cost?

7. If a man travel 38 miles an hour, how far can he travel in 27 hours?

8. What will 976 thousandths of a cord of wood cost at $8.75 per cord?

9. A field containing 30 acres is 80 rods long. How wide is it?

10. $.035 + .01\frac{1}{4} + .2\frac{3}{5} + 5.\frac{4}{5} + ?$

11. A father had $150000. He gave to one son $\frac{1}{4}$ of it, to another .942 of the remainder, and to the third .6 of what then remained. How much was left, and what was the share of each?

12.

Milwaukee, Sept. 4, 1882.

Mr. Cyrus Stearns,

Bought of Frisby & Sons,

Apr.	4.	145 lbs. butter,	@	$.25	$
"	20.	240 lbs. coffee,	"	$.14\frac{1}{2}$	
May	6.	648 lbs. sugar,	"	$.09\frac{1}{2}$	
"	24.	847 lbs. lard,	"	.15	
June	9.	142 bbl. flour,	"	6.20	
"	25.	324 gal. molasses,	"	$.62\frac{1}{2}$	

Cr. By cash, $820

" 20 tons hay, @ 10.50

Balance,

Received payment,

FRISBY & SONS,
By James Streeter.

13. I agree to give a drayman $13.23 for delivering 46 T. 790 *lb. of coal.* How much should he receive for delivering 5 *T. 310 lb.* ?

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14. A has $\frac{3}{5}$ of $\frac{5}{6}$ of $\frac{7}{8}$ of \$6387$\frac{3}{4}$, B has $2\frac{2}{3}$ times as much as A, C has $\frac{4}{5}$ of $\frac{15}{16}$ of $\frac{5}{6}$ of \$160964$\frac{1}{2}$, and D has $1\frac{1}{3}$ times as much as C. Which has the more and how much, B or D?

15. Find the difference between 10 A. 30 sq. rd. 1 sq. yd. 8 sq. ft. 30 sq. in., and 7 A. 37 sq. rd. 30 sq. yd. 3 sq. ft. 103 sq. in.

16. How many cords of wood in a pile 64 ft. long, 62 ft. wide and 15 feet high?

17. From a hogshead of syrup $\frac{2}{7}$ leaked out, and $\frac{3}{4}$ of the remainder was sold. How much was there remaining?

18. A druggist bought 2520 lb. of drugs avoirdupois, and retailed them by Troy weight. How many more pounds did he sell than he bought?

19. What length of time elapsed from half-past 4 o'clock, P. M., May 29, 1872, to January 1, 1880, at 12 o'clock and 15 minutes, A. M.?

20. When it is 8 A. M. on the 20th meridian west longitude, on what meridian is it 8 P. M.?

21. Mr. Wilson bought 843$\frac{3}{4}$ bushels of wheat at \$.75$\frac{1}{4}$ per bu.; $\frac{3}{20}$ of it spoiled in the warehouse and $\frac{1}{10}$ of it was stolen. For how much must he sell the remainder per bushel to gain 7$\frac{1}{2}$ ct. per bushel on what he had at first?

22. What decimal of 24$\frac{1}{4}$ is 17$\frac{1}{8}$?

23. What common fraction of 150$\frac{1}{4}$ is 37$\frac{1}{2}$?

24. $(.0042 \div .06) + (.000\frac{3}{8} \div 125) + (.0002 \div .000125) = ?$

25. A man bought 18 T. 8 cwt. 28 lb. of steel at 6 ct. a pound, and sold it at \$225 per ton. What was his gain?

26. A man's gain on a quantity of flour was \$245. How many barrels did he buy, his gain being 2$\frac{1}{2}$ cents per pound?

27. What will be the interest of \$7896.75 for 2 years 8 mo. 3 days, at 6 per cent?

28. From 1$\frac{1}{4}$ rods take 1 yd. and $\frac{3}{4}$ of a foot.

29. If a family consume 70 cwt. 20 lb. 7 oz. of flour in one year, how much will they consume in 5 years at the same rate?

30. A merchant bought 387 yards 2$\frac{1}{2}$ qr. of cloth. After selling $\frac{3}{8}$ of it he divided the remainder into patterns of 13 yd. 1$\frac{1}{2}$ qr. each. How many patterns did it make?

31. At \$175 per sq. rd. what will be the cost of a city lot 16$\frac{1}{2}$ rods by 4$\frac{1}{2}$ rods?

32. James Green bought of Herman Dodge, of Baltimore, the following articles:—March 5, 1879, 1 doz. shirts at \$1.25 apiece; Apr. 17, 1$\frac{1}{2}$ doz. pairs of socks at 37$\frac{1}{2}$ ct. per pair; Apr. 28, 4 pairs of gloves at \$2.40 a pair, 3 pairs of pants

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at $7.25 a pair; May 2, 3 vests at $3.80 apiece, 1 overcoat at $65; and May 20, 1 doz. handkerchiefs at 75 ct. apiece. Make out James Green's bill and receipt it.

33. $26600 was left to two charitable institutions, in the proportion of 1 to $\frac{4}{5}$. How much ought each to receive?

34. Starting from New York a gentleman finds, when he is at the end of his journey, that his watch has lost 8 hr. 48 min. 12 sec. What longitude is he in, New York being 74° 1′ west longitude?

35. A and B started from the same point to walk a mile in the same direction. A walked the distance and returned to meet B, who had walked $\frac{4}{5}$ of the distance, when they finished the mile together. How many rods more than B did A walk?

36. Reduce $\frac{7}{1760}$ of an acre to the fraction of a rod.

37. What is the value of $\frac{7}{8}$ of a hogshead of wine?

38. What part of a mile is 4 fur. 20 rd. 3 yd. 2 ft.?

39. Reduce 1.34 leagues to integers of lower denominations.

40. Reduce 3 qt. 1 pt. 2 gi. to the decimal of a gallon.

41. What is the sum of $\frac{2}{3}$ of a ton and $\frac{4}{5}$ of a cwt.?

42. From £$\frac{4}{5}$ take $\frac{2}{3}$ of $\frac{5}{8}$ of a shilling.

43. How many times are 9 bu. 2 pk. 4 qt. contained in 673 bu. 3 pk.?

44. When it is half-past 10 A. M. on the 45th meridian, west longitude, on what meridian is it 4 hr. 30. min. A. M.?

45. How many yards of carpeting 20 inches wide will be required to carpet a room 48 ft. long and 33 ft. 4 in. wide, and what will it cost at 2\frac{3}{8}$ per yard?

46. What is the interest of $9476 for 1 yr. 6 mo. 17 da. at 7$\frac{1}{2}$ per cent.?

47. If you should buy of W. T. Foster, of Detroit, 1 piece of sheeting, 43 yards, at 10$\frac{1}{2}$ ct. per yard; 10 yards of linen at $1.25 per yard; 42 yd. black silk at $3.50 per yd.; 12 yd. broadcloth at $6.75 per yd.; 4 silk umbrellas at $4.80 apiece; and 3 pieces of calico, each piece containing 45 yd., at 7$\frac{1}{4}$ ct. per yd., what would be the amount of your bill? Make it out in proper form.

48. Which travels the more, and how much more, A, who goes 3 times around a lot 1 fur. 16 rd. 16 yd. 4 ft., by 32 rd. 28 yd. 7 ft.; or B, who goes 6 times around a lot 24 rd. square?

49. A and B together owe $102375, but B owes only $\frac{1}{4}$ as much as A. How much does each one owe?

50. *Express* decimally $\frac{3}{4}$, $\frac{5}{8}$, $\frac{10}{11}$, $\frac{5}{625}$, $\frac{5}{1000}$.

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51. After two days of a sea-voyage a gentleman finds that his watch has lost 1 hr. 51 min. 20 sec. The port from which he sailed was 63° 36′ west longitude. In what direction had he sailed and in what longitude was he?

52. A certain school has 910 pupils, of which there are $1\frac{1}{3}$ as many girls as boys. How many boys and how many girls are there in the school?

53. $2 \times .2 \times .2 \times .2 \div .0002 = ?$

54. A man bought 248.75 cords of wood, at \$9.45 a cord. He sold $\frac{2}{5}$ of it at \$10.50 a cord and the remainder at \$10.75 a cord. How much did he gain?

55. If one lb. of zinc cover a square yard, and it is worth \$.455 a lb., what will it cost to line a tank 10 ft. square and 5 ft. deep?

56. A and B agree to buy calves; A has \$1649 and B has \$5423. They intend to pay the highest price per head that will allow each to invest all his money. How many calves can each purchase?

57. I bought 200 peaches at two for a penny, 180 at three for a penny, and sold them all at the rate of 5 for 2 cents. Did I gain or lose, and how much?

58. If a man traveling 7 hours a day, performs half his journey in $4\frac{1}{2}$ days, how long will it take him to travel the other half, traveling 5 hours a day?

59. A. T. Ray, of Albany, sold G. C. Wrenn 4685 feet of white pine at \$25 per M; 1120 ft. of oak plank at \$40 per M; 750 ft. of chestnut boards at \$88 per M; 2575 ft. of hemlock boards at \$30 per M. A. T. Ray bought of G. C. Wrenn 20 barrels of flour at \$6.50 per bbl.; 35 gallons of kerosene at 20 ct. per gal.; 2 boxes oranges at \$10.50 per box; 12 barrels of apples at \$3.25 per bbl. Make out Ray's bill against Wrenn, showing the balance due.

60. A man walked $\frac{1}{4}$ of a required distance and returned, then walked $\frac{1}{3}$ and returned, then $\frac{1}{2}$ and returned, and the fourth time finished the distance. If the required distance was $2\frac{1}{4}$ miles 40 rd. 12 ft., how many miles did he walk in all?

61. What is the entire cost of 3 marble pillars, each 20 ft. 6 in. high., 3 ft. 8 in. wide and 2 ft. 9 in. thick, at \$3.60 a cu. ft.?

62. An estate was divided between two sons so that $\frac{1}{3}$ of the elder's portion, + $\frac{2}{5}$ of the younger son's portion, was \$175000; and $\frac{2}{5}$ of the younger son's portion is 8 times $\frac{1}{4}$ of the elder son's. What was the share of each?

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63. A gentleman finds after traveling 5 days that his watch has gained 2 hr. 20 min. How many degrees of longitude has he passed over, and in what direction has he traveled?

64. If it require $3\frac{1}{4}$ yd. of cloth to make a cloak when cloth is $1\frac{1}{3}$ yd. wide, how many yards will be required when cloth is $\frac{4}{5}$ yd. in width?

65. What will it cost to paint the outside of a house 45 ft. long, 36 ft. wide and 27 ft. high, at 35 ct. a square yard?

66. What will it cost at $8.25 per square of a hundred feet, to put a tin roof on a building 120 ft. long and the width of each side 20 ft.?

67. If 50 bbl. of flour cost $500\frac{1}{2}$, what will $\frac{1}{4}$ of a bbl. cost?

68. I own $\frac{3}{16}$ of a ship which is worth $48000. If I sell $\frac{2}{3}$ of $\frac{1}{4}$ of my share what part of it have I left, and what is it worth?

69. If 30 loads of hay contain 70 T. 10 cwt., what is the value of one load at 6 ct. a pound?

70. A can remove 54 cubic yards of earth in a day, B 81, C 63, and D 14. What is the smallest number of cubic yards that will furnish exact days' labor for each of them digging alone?

71. Three boys plant a grove. John plants 75 trees, James 125, and Henry 160. They agree to plant the trees in groups of the largest number that will allow each one to form an exact number in each group. How many trees in a group, and how many groups of trees had each?

72. Add $\frac{4}{5}$ of $\frac{7}{12}$ of a number to three times itself, and from the sum take $\frac{1}{2}$ of $\frac{3}{4}$ of twice itself, and multiply the remainder by $\frac{1}{3}$ of $\frac{3}{4}$ of four times itself, and the product will be 9648. What was the original number?

73. How long will it take, in days, &c., to empty a cistern 7 ft. square and 11 ft. deep, if one hogshead be pumped out each hour?

74. How many silver cups can be made from 16 lb. 6 oz. of silver, if each cup weigh 2 oz. 15 pwt.?

75. C. A. Wells, of New Orleans, sold Henry Dodge the following articles: Feb. 9, 360 yd. silk at $2.12\frac{1}{2}$ per yd. Feb. 22, 214 yd. cloaking at $3.75 per yd.? Apr. 4, 32 pair cotton hose at 15 ct. per pair; May 1, 20 doz. pair gloves at $1.10 per pair, and 150 hats at $1.87\frac{1}{2}$. He paid $650.75 in cash, and groceries to the amount of $480.40. Make out bill with credits and show balance due.

76. What is the cost of 15 T. 9 cwt. 2 qr. 20 lb. at $65 a ton?

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77. How many bricks will be required to lay a foundation 10 ft. high and $1\frac{1}{2}$ ft. in thickness, for a house 46 ft. by 22 ft., and what will be the cost, the bricks being \$27.60 per M, and the cost of laying them $\frac{1}{4}$ the cost of the bricks?

78. If 189000 sq. ft. of land be divided into 36 lots, each 175 ft. deep, half of which shall be twice as wide as the other half, what will be the width of the lots?

79. How many shingles will be required to cover the roof of a building 54 ft. long and two sides each $16\frac{1}{2}$ ft. wide, if one shingle cover a space 6 inches square?

80. A plank walk 7 ft. wide was built around a lot 72 rd. 16 ft. 4 in. square. What was the cost at \$.20 a sq. ft., and how many boards 14 ft. long and 16 inches wide were required, there being no waste?

81. How much must I pay for 18 cwt. 58 lb. of hay at $\frac{1}{2}$ ct. a pound?

82. What would it cost to plaster a wall $32\frac{2}{3}$ ft. long and 9 ft. high at 27 cents per sq. yard?

83. What is the value of .4375 of a gross?

84. How many rolls of paper, each 8 yards long and 18 in. wide, will it take to paper the sides of a room 16 ft. by 14 ft. and 10 ft. high, deducting 124 square ft. for doors and windows?

85. What is a person's age Apr. 11, 1882, he having been born Sept. 20, 1845?

86. A owns $\frac{5}{12}$ of a ship's cargo, B owns $\frac{2}{7}$ of the remainder, C owns $\frac{1}{18}$ as much as A and B together, and D owns the remainder, which is \$70875. What is the entire value of the cargo?

87. How many boards will it take to floor a building 850 ft. long by 688 ft. wide, each board being $12\frac{1}{2}$ ft. by 6 inches?

88. A stone wall 40 ft. by $32\frac{1}{2}$ ft. is 11 ft. 3 in. high, and 1 ft. 6 in. thick. What did it cost at \$5.75 a perch, equal to $24\frac{3}{4}$ cubic ft.?

89. March 30, 1880, William is 14 yr. 7 mo. 9 da. old. When was he born?

90. A man bought 25 cords of wood at $\$6\frac{2}{3}$ per cord, paid $\$1\frac{1}{3}$ for sawing and splitting, and .125 of the price of sawing and splitting for piling. What was the entire cost of the wood?

91. What is the cost of papering a room 30 ft. by 25 ft. and 15 ft. high, with paper at 90 ct. a roll, each roll $7\frac{1}{2}$ yd. long and 15 in. wide, and what is the cost of the bordering at 50 ct. a yard?

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92. What is the exact number of days from Aug. 15, 1877, to Apr. 10, 1880?

93. Three men A, B and C, agree to work for $1.75 each per day's work. Together they work 43 days; B works 5 days more than A, and C 3 days more than B. How much must each receive?

94. A man invested $\frac{3}{5}$ of his money in a farm, $\frac{1}{8}$ of it in stock, and the remainder in farming utensils, which cost $900 more than $\frac{1}{12}$ of the whole. How many dollars did he invest?

95. A man bought $\frac{4}{9}$ of a factory and sold $\frac{2}{3}$ of his share to one man, and the remainder to another for $4000. What was the value of the factory?

96. How many yards of cloth $\frac{7}{8}$ of a yard wide are equal to 30 yards $\frac{4}{7}$ of a yard wide?

97. At $6 a thousand what is the cost of shingling a roof 45 ft. long, each side 25 ft. wide, if 5 shingles cover a square foot?

98. If 3 pounds of zinc cover a square yard, and it is worth 33$\frac{1}{3}$ cents per lb., what will it cost to cover and line a tank 6 feet square and 6 feet deep?

99. A speculator bought 7896 bushels of wheat at $1.25 per bu., and sold $\frac{3}{8}$ of it at $1.35 per bu., $\frac{2}{5}$ of the remainder at $1.50 per bu., and the remainder at cost. What was his gain?

100. From the top of a tree, whose height was 140 feet, a piece was broken off by the wind, and $\frac{4}{5}$ of the part left standing equaled $\frac{4}{9}$ of the piece broken. What was the length of each piece?

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SEVENTH AND EIGHTH GRADES.

LESSON I.

Write the following rates per cent. as decimals:

1. $4\frac{1}{6}\%$;	*5.* 101%;	*9.* 42%;	*13.* $81\frac{1}{7}\%$;	*17.* $\frac{1}{100}\%$;
2. $\frac{1}{4}\%$;	*6.* $3\frac{4}{10}\%$;	*10.* $50\frac{3}{4}\%$;	*14.* $15\frac{1}{3}\%$;	*18.* $100\frac{1}{8}\%$;
3. 25%;	*7.* 200%;	*11.* 420%;	*15.* 314%;	*19.* $\frac{7}{12}\%$;
4. $\frac{5}{6}\%$;	*8.* $8\frac{3}{5}\%$;	*12.* $5\frac{2}{3}\%$;	*16.* $98\frac{1}{3}\%$;	*20.* 1000%.

To what common fraction is each of the following equivalent:

1. 9%;	*5.* 14%;	*9.* $\frac{1}{4}\%$;	*13.* $33\frac{1}{3}\%$;	*17.* $\frac{1}{8}\%$;
2. 20%;	*6.* 50%;	*10.* $12\frac{1}{2}\%$;	*14.* $\frac{2}{5}\%$;	*18.* 28%;
3. 60%;	*7.* $\frac{1}{3}\%$;	*11.* 18%;	*15.* 200%;	*19.* $\frac{1}{4}\%$;
4. 12%;	*8.* 75%;	*12.* $16\frac{2}{3}\%$;	*16.* $6\frac{1}{4}\%$;	*20.* 70%.

LESSON II.

PERCENTAGE = BASE × BY THE RATE.

1. What is 7% of \$428?	Of \$480?
2. What is $5\frac{1}{2}\%$ of \$1000?	Of \$7280?
3. What is 1% of \$8960?	Of 60 cents?
4. What is $16\frac{2}{3}\%$ of \$50.50?	Of \$45.20?
5. What is $12\frac{1}{2}\%$ of \$65.05?	Of \$70.70?

LESSON III.

1. What is 200% of \$640.48? Of \$3010.10?
2. What is $\frac{4}{5}\%$ of \$3080? Of \$15.40?
3. What is $1\frac{1}{2}\%$ of \$90.90? Of \$7.07?
4. What is $33\frac{1}{3}\%$ of 930 bushels? Of 1200 bushels?
5. What *is the amount* of \$53.68 for 4 years 6 months at 5%?

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LESSON IV.

1. What is $2\frac{1}{2}\%$ of \$10? Of \$110?
2. What is 8% of 7? Of $13\frac{1}{3}$? Of $10\frac{1}{2}$? Of $\frac{4}{5}$? Of $3\frac{1}{4}$?
3. What is 9% of $9\frac{1}{3}$? Of $10\frac{1}{3}$? Of 14? Of $5\frac{1}{3}$? Of $7\frac{1}{3}$?
4. What is 105% of $15\frac{3}{4}$? Of 8.1? Of 105? Of $3\frac{3}{5}$? Of 15?
5. What is the amount of \$22.86 for 8 years 11 months 3 days at 1%?

LESSON V.

1. What is the difference between $9\frac{1}{2}\%$ of 2000 and $4\frac{1}{4}\%$ of 1800?
2. A grocer bought 1790 gallons of molasses and lost 17% by leakage. How much had he left?
3. A commission merchant upon receiving 500 boxes of oranges found 18% of them spoiled. How many boxes had he that were salable?
4. A merchant invested \$12840 in business and lost 25% of it the first year and 20% of what remained the second year. How much had he left at the end of the second year?
5. What is the amount of \$9460.80 for 2 years 4 months and 3 days at $7\frac{1}{2}\%$.

LESSON VI.

1. A man owning $\frac{3}{5}$ of a cotton crop shipped 30% of it. What part of the crop did he sell, and what per ct. had he left?
2. A commission merchant sold goods to the amount of \$2480.20 and received 5% for selling and $2\frac{1}{2}\%$ for boxing and shipping. What were the net proceeds of the sale?
3. $46 \times .009 \div 36$ hundredths $\div .012 \div 5 = ?$
4. Find the amount of \$786.06 for 1 yr. 11 mo. 12 d. at $9\frac{3}{5}\%$.
5. A, B and C divide $1290\frac{3}{5}$ bushels of wheat among themselves, A taking $.37\frac{1}{2}$, B $\frac{6}{25}$, and C the remainder. How many bushels had each?

LESSON VII.

PERCENTAGE ÷ BY BASE = RATE.

1. What per cent. of \$320 is \$80?
   What per cent. of \$75 is \$2.25?
2. 54 dollars is what per cent of \$432?
   What per cent. of \$84.25 is \$13.48?
3. 80 bushels of wheat is what per cent. of 1600 bu.?
   What per cent of 296 is $49\frac{1}{3}$?

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4. A house and furniture valued at $9612 were destroyed by fire; the insurance was $6408. What per cent was it of the entire value?
5. What is the sum of ⅞ of 1% of $900 and 7% of $650?

LESSON VIII.

1. What per cent. of ¼ is ⅛?
   What per cent. of ⅛ is ¼?
2. What per cent. is 5s. 6d. of £5 10s.?
3. What per cent. of 550 sheep is 377 sheep?
   What per cent. of ⅚ is ⅓?
4. At 4½% what is the amount of $1664.80 for 4 years 6 months 15 days?
5. A and B gathered apples on shares; A had 12½% and B 16⅔% of the amount gathered, which was 2400 bushels. How many more bushels had B than A?

LESSON IX.

1. What per cent. of ⅘ is ⅔?
   What per cent. is .096 of .480?
2. What per cent. of 135 bu. 3 pk. 6 qt. is 3 bu. 2 pk. 4 qt.?
3. A invested $2000 in wheat and B the same amount in corn. A lost 100% of his investment and B gained 250% on his. What was the result of their investments?
4. Find the amount of $9280.80 for 3 years 10 months 15 days at 8⅓%.
5. A lawyer charged 8⅓% for collecting a bill of $225, and 9½% for collecting $987. How much did he receive for his services?

LESSON X.

1. ⅞ of a farm is what per cent. of its entire value?
2. From a cargo of 59700 ft. of lumber 19900 ft. were washed overboard. What per cent. of the whole remained?
3. A miller manufactured 5280 barrels of flour; he sold 12½% at one time, 20% of the remainder at another, and 50% of what remained after the second sale at another? How many barrels had he left?
4. Find the amount of $64.64 for 5 years 5 months 5 days at 7½%.
5. $6 \div 37\frac{1}{2} \times 100 - .025 \div 500 \div 12 = ?$

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LESSON XI.

PERCENTAGE ÷ BY RATE = BASE.

1. 32 is 8% of what number?
   75 is 15% of what number?
2. 360 is 16⅔% of what number?
   17.24 is 33⅓% of what number?
3. 113.40 is 17½ per cent. of what number?
   136.5 is 325% of what number?
4. A man owning 150 acres of land, for which he paid $84.80 an acre, sold it all for $15900. What was his gain per cent.?
5. Find the interest of $1720 at 6%, loaned July 20, 1872, and paid Jan. 5, 1874.

LESSON XII.

1. 49.99 is 1% of what number?
   336 men are 16% of how many men?
2. 27.3 bu. is 7% of how many bu.?
   394.26 is 33⅓% of what number?
3. A man's income is $3544, which is 12½% of the amount he has invested. What is the amount invested?
4. Out of 2 casks, each containing 125 gallons, 8% was lost by leakage and 40% was sold. What per cent. of the whole remained?
5. A man owning 2400 sheep kept 33⅓% in one field, 16⅔% in the second, 20% in the third, and the remainder in the fourth. How many sheep in each field?

LESSON XIII.

1. 800 is 160% of what number?
   800 is 25% of what number?
2. £42 7s. is 43¾% of what number?
3. ⅜ is 32% of what number?
   56.16 is 12½% of what number?
4. A man's income is $3500; he paid 25% of it for board, 15% of the remainder for clothing, and 20% of what then remained for incidentals. What amount had he left at the close of the year?
5. A man having 1200 head of cattle sold ¼ of them at one *time*, and ⅔ of the remainder at another time. What per *cent.* remained unsold?

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LESSON XIV.

1. $8\frac{1}{3}$ is $\frac{1}{4}\%$ of what number?
   $7\frac{1}{2}$ is $\frac{1}{3}\%$ of what number?
2. 2 hhd. 3 gal. 2 qt. is 14% of what number?
3. A man having lost $16\frac{2}{3}\%$ of a crop of wheat had 840 bushels remaining. How many bu. had he at first?
4. A man borrowed \$1240 and paid \$49.60 for the use of it. What per cent. did he pay?
5. A business block valued at \$24000 rented last year for \$1800. What per cent was it on the investment?

LESSON XV.

1. .42 is $16\frac{2}{3}\%$ of 75% of $33\frac{1}{3}\%$ of 112% of what number?
2. $\frac{1}{2}\%$ of $\frac{1}{4}\%$ of .126 is 75% of what number?
3. \$2750 is 25% of what number?
4. What per cent. do I lose when I sell goods at $\frac{5}{8}$ their cost?
5. A man shipped 20 cases of eggs, each case containing 24 doz., and during transportation $\frac{1}{8}$ of them were broken. What per cent. of the shipment was marketable?

LESSON XVI.

1. 2% of 416 is 64% of what number?
2. $\frac{1}{8}\%$ of 112 is .007 of what number?
3. A lawyer received \$426.30, which was 7% on the money collected. After deducting his fees what amount had he left for his client?
4. A stock dealer had 750 head of cattle; he sold at one time 100 head and at another 65 head. What per cent. of the whole did he sell?
5. A man having \$2500 invested \$625 in groceries and $16\frac{2}{3}\%$ in carpeting. What per cent. of the original sum had he remaining?

LESSON XVII.

BASE = AMOUNT ÷ (1 + RATE).

1. What sum amounts to \$451.25 at 25%?
   What sum amounts to \$47.234 at $4\frac{1}{2}\%$?
2. What sum amounts to \$201.87$\frac{1}{2}$ at $112\frac{1}{2}\%$?
   What sum amounts to \$164 at $2\frac{1}{2}\%$?
3. What sum amounts to \$200 at 100%?
   What *sum amounts to* \$477 at 6%?

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4. A man owning 60% of a woolen factory sold 30% of his share for $8190. What was the entire worth of the factory?
5. When I sell goods at 2½ times their cost, what per cent. do I make?

LESSON XVIII.

1. What sum amounts to $73.08 at 1½%?
   What sum amounts to $1199 at 9%?
2. What sum amounts to $130.38 at 6%?
   What sum amounts to $832 at 33⅓%?
3. What sum amounts to ⅞ at 12½%?
   What sum amounts to 7⅞ at 3½%?
4. What was the amount of a note for $1600, given Dec. 4, 1875, and paid Aug. 27, 1877, at 7%?
5. A farmer lost 36 sheep, which was 25% of the number he had in the first field, and the number in the first field was 72% of the number in the second field. How many had he at first in both fields?

LESSON XIX.

1. What number increased by 16% of itself is equal to 4988?
   What number increased by 66⅔% of itself is equal to 13320?
2. A man bought a horse and carriage; he paid $900 for the carriage, which was 150% more than he paid for the horse. What did he pay for the horse?
3. A merchant sold goods at an advance of 23½%, and they brought him $52240.50. What did they cost him?
4. .125 of 3456 is what per cent. of ⅛ of ⅛ of .75 of 13824?
5. A person receives $4680, which is 36% of a debt. What was still due him?

LESSON XX.

1. 35.98 is 2¼% more than what number?
   3843 bushels is 16⅔% more than what number of bu.?
2. $41.61 is 9½% more than how many dollars?
   What number increased by 1% of itself equals 909808?
3. A man promised to pay 7% for the use of $45220 for one year, but carelessly wrote 17%. How much more interest did the note demand than the verbal agreement?
4. What is the sum of 125% of 16 and ¼ of 35?
5. A man gave his son $45000, which was 9% of his entire property. How much had he remaining?

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LESSON XXI.

1. 34 hhd. 15 gal. 2 qt. 1 pt. is 210% of what number?
2. Lumber sold on the first day of June at $15 per M, and the first of October for $17 per M. What per cent. had the price advanced?
3. The amount of a note for one year at 12½% was $8827.20. What was the principal?
4. On the disbanding of an army 35% of its original number were missing, and 54210 remained. What did the army number at first?
5. If ⅓ of my money is in real estate, ¼ in stocks, ⅛ in merchandise, and the remainder, which is $2300, is in the bank, how much am I worth?

LESSON XXII.

1. What number increased by 4⅓% of itself equals 773.11?
2. A city lot was valued at $6279, which was 15% more than its value the year previous. What was the amount of its increased value?
3. What is the amount of $25290 for 10 days at 6%?
4. A speculator invested in stocks which, falling in price, he sold ½ for $2349, which was a loss of 13%; the other half for $2226, which was a loss of 12½%. What was the amount of his purchase?
5. A man paid $21600 for a house, which was double the value of the lot and 25% in addition. What was their combined value?

LESSON XXIII.

DIFFERENCE ÷ by 1 — RATE = BASE.

1. $838.95 is 15% less than what number?
2. 16779.28 bu. is 17% less than what number?
3. What is the amount of $9876.60 for 2 years 10 months 15 days at 7½%?
4. If from a flock of 1200 sheep ¼ were sold at one time, and ⅓ of the remainder at another, what per cent. of the flock was sold?
5. What *is the cost of* 7860 bricks at $7.50 per M, and 18460 *ft. of boards at* $4½ per C?

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LESSON XXIV.

1. $3515.40 is 19% less than what number?
2. $525.30 is 25% less than what number?
3. $170.52 is 13% less than what number?
4. A sum of money was divided among A, B and C as follows: A had 40% of the whole, B 27½% and C the remainder, which was $9750. What amount did each receive?
5. What is the entire cost of a load of hay weighing 1760 pounds at $13.75 per ton, and 7860 pounds of cheese at $240 per ton?

LESSON XXV.

1. $140.14 is 12½% less than what number?
2. 5880 bushels is 16⅔% less than what number?
3. A man built a house at a cost of $16250; he paid yearly $500 to keep it in repair and received $1475 rent. What per cent. did the investment pay?
4. A man bought a farm for $11000 and put upon it stock and farming utensils to the amount of $2000. What per cent. was that of the value of the farm?
5. $(.48 \div 800 \times 10000 + 6.4 \div .08) \div .125 = ?$

LESSON XXVI.

1. A has 980 sheep, which is 33⅓% less than his neighbor has. How many sheep has his neighbor?
2. $220.22 is 8⅓% less than what number?
3. A printer issued 250000 grammars; the first month he sold 50000 copies, the next three months 10000, and the next three months twice as many as he sold in the four preceding months. What per cent. of the number printed had he left?
4. 25% of $890 is 8% of what number?
5. The sum of two numbers is 50⅝, one of the numbers is 13¼. What is the other expressed decimally?

LESSON XXVII.

1. A man's expenses are $3200 a year, which is 20% less than his income. What is his income?
2. *A man paid* $72051 for cotton, which was 27% less than he

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sold the cloth for that he manufactured out of it. What did he receive for the cloth?

The assessment of a town in 1882 was $343144, which was 18 % more than it was in 1881. What was the assessment in 1881?

A man paid me $281.25, which was 37½% of the amount he owed me. What was the original amount?

What is the amount of $760.70 for 2 yr. 9 mo. 6 da. at 8%.

LESSON XXVIII.

A's income was $7740, which was 7½% more than B's and 12½% more than C's. What was their combined income?

I owned ⅛ of a factory and sold 12½% of my share for $1000, which was 20% less than its value. What was the value of the factory?

A man gave $3000 to a charitable institution, which was 10% of his income. What was his income?

What is the amount of $7640 for 3 yr. 10 mo. 15 da. at 6¼%.

A man spent ⅓ of his money for land, ⅓ of the remainder in building upon it, and the remainder, which was $3000, in stocking it. What amount did he invest?

LESSON XXIX.

A cargo of wheat being damaged was sold for $4380, which was 37½% less than it cost. What did it cost?

A farmer's crops were worth $1398, which was 22½% less than the year previous. What was the value of his crops the previous year?

A bought a house which increased in value 20% the first year and 16⅔% on its increased value the second year, when he sold it for $10472. What did he pay for it?

What is the amount of $678.50 for 1 yr. 6½ mo. at 6⅔%?

If 34 boxes of berries cost $5.66⅔, what part of a box can I buy for 12½ cents?

LESSON XXX

The combined ages of a father and son was 52 years, and the son's age was 30% of the father's age. What was the age of each?

I remitted $8775 from the sale of some land, having deducted 2½% for my services. How much did I receive for *the land?*

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3. I drew from bank 25% of my deposit at one time, and 15% at another, when I had remaining to my credit $2400. What was my deposit?
4. $(3 \div 18\frac{3}{4}) \div (2 + 31\frac{1}{4})$ equals what decimal?
5. What was the amount of a note for $560 at 10%, given May 14, 1877, and taken up Jan. 1, 1880?

LESSON XXXI.

COMMISSION = AMOUNT × RATE.

1. An auctioneer sold $1400 worth of furniture and charged $5\frac{1}{2}$% commission. How much did he receive?
2. A lawyer collected bad debts amounting to $2400 and charged 18% commission. What was his commission?
3. I pay a real-estate agent $2\frac{1}{2}$% for selling a section of land at $10 per acre. What is the commission, and how much do I receive?
4. What is the amount of $9786.06 for 2 years 8 months 10 days at $7\frac{1}{2}$%?
5. A receives $650 for the rent of a house, which is $12\frac{1}{2}$% of his income, and his income is $62\frac{1}{2}$% of B's income. What is B's income?

LESSON XXXII.

1. A commission merchant sells 2520 bushels of wheat at $1.45 per bushel, on a commission of $4\frac{1}{2}$%. What is his commission?
2. An agent charged $3\frac{1}{2}$% for selling 360 barrels of flour at $9\frac{1}{2}$ per barrel. What is his commission?
3. I shipped to my agent in Chicago 898 bbl. of flour, and agreed to give 4% commission. He sold the flour at $7.75 per barrel. What was his commission, and how much did I receive?
4. Find the amount of $1000.10 for 10 days at $9\frac{1}{2}$%.
5. In a cistern 6 feet square and 5 feet deep, $25\frac{2}{3}$% of the water leaked out. How many gallons remained in?

LESSON XXXIII.

1. I purchased land for $14230 at $2\frac{1}{4}$% commission. What was the amount of my commission?
2. *A druggist* sold $2500 worth of medicines. What was his *commission* at 20%?

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3. What is the commission on the sale of 5500 lb. of wool at $.40 per lb., commission 5½%?
4. From 20% of 403 T. 17 cwt. 55 lb. take 12½% of 17 T. 56 lb.
5. A had to travel a distance of 1200 miles; after having gone 660 miles what per cent. of the distance traveled was the number of miles that remained to be traveled?

LESSON XXXIV.

1. What will be the commission, at 6¼%, on the sale of property amounting to $11200?
2. What will it cost to collect $840 at 1¼% commission?
3. Find the commission on the sale of 4860 tons of coal at $6.75 per ton at 15% commission.
4. The average attendance of a school is 764 pupils, which is 4⅓% less than the enrollment. What is the number enrolled?
5. A druggist bought 1000 gallons of wine at 13½s. per gallon. If the duty was 8% on the cost, what must be the selling price per gallon to realize 25% profit?

LESSON XXXV.

1. A fruit dealer sold 80 crates of berries, each containing 24 qt., at 8½ cents per qt. What was his commission at 3⅓%?
2. An agent sold 18 hogsheads of sugar, averaging 1112 pounds each, at 8½ cents per pound, charging 3¼% commission. What was his commission?
3. A commission merchant purchased 2580 bu. of wheat at $1.50 per bu.; his commission was 2½% for buying, 1½% for shipping, and 3% for freight. What was his commission?
4. A man having a quantity of flour sold 30% of it at one time, and 15% more the second than the first time, and had 325 barrels left. How many barrels had he first?
5. Find the amount of $720.07 for 1 year 1 month 1 day at 6½%.

LESSON XXXVI.

1. I sent to my agent 3 car loads of potatoes, each car containing 580 bushels. He sold them at 95 ct. per bu. and charged 4½% commission. What was his commission, and how much did I receive?
2. An agent charged 2⅓% for collecting $9270. What was his commission?

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3. I[illegible] a certain city increased 12½% every year when it was found to be 81,000. What [illegible]ation at the commencement of the first

[illegible]t of $986.90 for 1 year 10 months 12 days at

[illegible]0÷.02)+(.288÷3.6÷100÷.11) equals what?

LESSON XXXVII.

INVESTMENT = AMOUNT ÷(1+ RATE).

1. I receive $10425 to invest in western land, after taking out my commission of 4¼%. What amount do I invest, and what is my commission?
2. How many barrels of flour at $7 per barrel, can an agent buy for $2646 after taking out his commission of 5%?
3. How many chairs at $2.50 each can an agent buy for $636, after deducting a commission of 6% for his services?
4. What is the commission on 40 hhd. of syrup at $.80 per gallon, agent charging 3½% commission?
5. An agent charged 3½% commission for buying 30 loads of hay, each load weighing 1820 pounds, at $7.50 per ton. What was his commission?

LESSON XXXVIII.

1. An agent recovered 75% on a note of $70400 against a firm which had gone into bankruptcy. After deducting his commission of 10% what amount should he remit to his employer?
2. A commission merchant received $4499.04 with which to purchase stock. After deducting his commission of 4% what sum did he invest?
3. A country merchant sent $7120.80 to his agent in the city to invest in furniture at $80 a set. After deducting his commission of 3½% how many sets did he buy?
4. What is the commission on 150 barrels of flour at $9.50 per barrel, commission being 4½%?
5. Find the amount of $7830 for 2 years 9 months 17 days, at 9⅓%?

LESSON XXXIX.

1. A commission merchant in New York receives $4100 with which to purchase merchandise, after deducting his commission of 2½%. What is the amount of the purchase?

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2. What part of a remittance of $4646 will be left to be invested after 1% of it has been deducted?
3. How many shares of $100 each can a broker purchase with $27170 after deducting a brokerage of 4½%?
4. Find the commission at 15% on the sale of 4860 tons of coal at $6.75 per ton.
5. 33⅓% of 409 A. 20 P. was planted in corn and the remainder in wheat. How many acres in wheat?

LESSON XL.

1. An agent received $12831 to invest in flour at $6.50 per bbl. after deducting his commission of 5%. How many barrels did he buy?
2. A merchant sent $1648 to New Orleans to be invested in sugar, after deducting a commission of 3%. What amount was invested?
3. An agent was employed to collect and invest 1 year's interest, at 7%, on notes amounting to $208000. After taking out 2½% for collecting and 1½% for investing. What amount did he invest?
4. What is the commission on the sale of 150 shares of stock at $.98¼ a share, brokerage ⅛%?
5. After buying 120 bbl. of salt I discovered that they lacked 14¼% of the required weight. What was the entire deficiency, and how many pounds did each barrel contain?

LESSON XLI.

NOTE.—Profit and Loss.

1. A man bought a farm for $8064, and sold it at 12½% profit. What was his gain?
2. A merchant bought 40 jars of butter at $3.50 a jar, and sold it so as to gain 20%. What was his gain?
3. A speculator bought 125 barrels of flour at $7.50 per barrel, and sold it at 25% profit. What was his gain?
4. I sent my agent $1722 to invest in wool, after deducting his commission of 2½%. What was the amount invested?
5. A commission merchant received $702.81 to invest in butter, after deducting his commission of 2¼%. How much did he invest?

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LESSON XLII.

1. An elevator containing 7680 bushels of wheat had 12½% of it destroyed by water. What was the loss if the wheat was valued at $1.25 per bushel?
2. A farmer realized $1500 profit from selling stock one year; the next year he gained 30% more than the first year, and the third year he lost 50% of what he had gained the two preceding years? How much had he gained at the end of the three years?
3. A commission merchant bought 25 jars of butter, averaging 20 pounds, at 25 cents per pound, and sold it at 33⅓% profit. What was his gain?
4. A broker received $9983.75 with which to purchase live-stock. After deducting his commission of 1¼% what amount did he invest in stock?
5. A real estate agent received $11965.80 to invest in lots at $120 per lot, after deducting his commission of 1¼%. What amount did he invest and how many lots did he purchase?

LESSON XLIII.

1. At what price must I sell cloth that cost $5 per yard to gain 30%?
2. Seven hundredweight of sugar that cost 8½ cents a pound was sold at a gain of 8%. What was the gain and what the selling price per pound?
3. A grocer bought tea for $.75 and sold it at 14% profit. What was the selling price per pound?
4. What number is that which diminished by ¾% of itself, is $19.85?
5. A tax-collector is paid 5½% for collecting a tax of $708960. What is his fee, and what are the net proceeds?

LESSON XLIV.

1. I bought a house for $6500, paid a sum equal to 10% of the cost for repairs, and sold it at a gain of 18%. What was the selling price?
2. Bought 75 tons of coal at $5.75 per ton, and sold it at a gain of 14%. How much did I receive for it, and what was my gain?
3. What was the profit on flour that cost $1350, and was sold at a gain of 12½%?

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4. An agent receives $42200 from the sale of land and invests the amount in pork, after deducting 4% commission for buying, and 1½% for selling. What was the amount invested?
5. An auctioneer received $461.70 for selling $4860 worth of goods. What was the rate of commission?

LESSON XLV.

NOTE—To find per cent.

1. A man bought a farm for $3000 and sold it for $4500. What per cent. did he gain?
2. A grocer bought tea at $.75 per pound and sold it at $1.25. What per cent. did he make?
3. A merchant bought 40 yards of broadcloth at $4.50 per yard and sold it for $220. What per cent. did he make?
4. A man had a cattle-ranch of 1000 head which increased 20% the first year, and 25% the second year, when he sold 40% of the entire number. How many did he sell, and how many had he left?
5. What is the cost of a pile of wood 120 ft. long, 40 ft. wide and 10 ft. high, at $4.50 per cord?

LESSON XLVI.

1. A farmer bought sheep at $2.25 per head and sold a number of them at $1.25 per head. What was the loss per cent.?
2. A grocer bought syrup at 80 cents a gallon and retailed it at $1.20. What was his gain per cent.?
3. A man bought a span of horses and a carriage for $750 and sold them for $1000. What was the gain per cent.?
4. A man bought a house for $4040; he paid $500 for painting, 20% as much in other repairs as for painting, then sold it at a gain of 20%. What was the profit?
5. Reduce ⅘ of ⅓ of ½ of 2 pounds to pennyweights.

LESSON XLVII.

1. What per cent. of profit is made on cloth bought for 16 cents and sold for 18 cents?
2. What per cent. of profit is made on sugar bought for 8½ cents a pound and sold for 9 cents a pound?
3. Silk costing $1.75 per yd. was sold for $2.15 per yd. What *per cent. of profit* was realized?

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4. A grocer bought 50 bbl. of apples at $3.00 per bbl., and sold them at a loss of 15%. What was his loss?
5. Reduce $\frac{1}{8}$ of a foot to the fraction of a rod.

LESSON XLVIII.

NOTE.—To find the selling price when the gain or loss per cent. is given.

1. To make 10% profit what must goods be marked that cost 12 cents per yard? 15 cents? 50 cents? 60 cents? 75 cents?
2. A factory which cost $75680, and was insured for $56760, was destroyed by fire. What was the loss per cent.?
3. I bought 20 cases of boots and shoes at $75 each, and sold them at an advance of 18¾% on the purchase price. What was the entire gain?
4. A broker buys for a customer 250 shares of railroad stock, of $100 each, and sells them the same week. What is his brokerage at 1% for each transaction?
5. What is the value of $\frac{1}{8}$ of a £?
   What is the value of $\frac{1}{4}$ of an acre?

LESSON XLIX.

1. For how much must I sell sugar per pound that cost me 10 cents, to gain 20%?
2. A grocer paid $75 for 150 barrels of potatoes. For how much must he sell them to gain 16⅔%?
3. A speculator bought 280 bales of cotton for $11300, and sold it at a loss of 5%. What did he receive for it, and how much per bale?
4. I bought cloth at $3.00 per yd. and sold it at $5.00. What was the gain per cent., and how much was made of 2 pieces of 45 yards each?
5. What part of 6 rods is 14 yd. 2 ft.?
   What part of a mile is 122 rd. 2 yd. 2 ft.?

LESSON L.

1. A man bought 160 acres at $50 per acre, and gave 25% of the cost of the land for buildings. For how much must he sell it to gain 12½%?
2. A merchant bought 50 pieces of print, each piece containing 32 yards, at 12½ cents per yard. For how much must he sell it to gain 17%, and what will he receive per yard?

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3. A grocer bought 2 hogsheads of vinegar at 18 cents per gallon, and sold it at a gain of 12½%. How much did he receive for it, and what was his profit?
4. A man bought 20 dozen brooms at 30 cents each, and sold them at 37½ cents each. How much did he gain on the whole, and what per cent. on the money invested?
5. What is the value of .45 of a hogshead?
What is the value of .45 of a league?

LESSON LI.

1. What is the selling price of coffee costing 20 cents per pound, on which 20% profit is realized?
2. At how much per pound must cheese be sold, costing $12.50 per cwt., to gain 28%?
3. To make 20% profit what must cashmere be marked that cost 60 cents? $1.00? $1.10? $1.50? $1.75?
4. If a grocer sell 10 pounds of sugar for 12 pounds, what per cent. does he gain?
5. Find the amount of $1514.70 for 3 mo. 27 da. at 1½% a month.

LESSON LII.

1. A house cost $6350, repairs $450. For how much must it be sold to realize 18¾% and pay an agent a commission of $175?
2. A gentleman lost 8% on the sale of property that cost him $37650. What was the selling price?
3. For what price must I sell goods that cost $⅞ to gain 20%?
4. A merchant bought a piece of flannel containing 48 yards for $24, but being damaged he sold it for $19.20. What was the rate per cent. loss, and what his selling price per yard?
5. Reduce ⅘ of a pint to the decimal of a bushel?
Reduce 12 yd. 2 ft. 4 in. to the decimal of a mile?

LESSON LIII.

NOTE.—To find the cost when the selling price and the gain or loss per cent. is given.

1. A commission merchant sold a quantity of flour for $1610, which was 15% more than it cost. What did it cost?
2. A man sold a *farm* for $9284, which was 10% more than it *cost him.* *What* did it cost him?

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3. I sold a farm for $9288, which was 10% less than cost. What was the cost?
4. A speculator bought 900 bushels of wheat at $1.25 per bu., and sold it at 12½% profit. What did he receive for it, and what was his gain?
5. A man sold ⅗ of his farm for what he paid for ⅖ of it, and the remainder for what he paid for ¼ of it. What was the per cent. of loss or gain?

LESSON LIV.

1. I sold 40 bu. of wheat at $1.17 per bu., which was 17% more than I paid for it. What did it cost, and what was the amount gained?
2. Having some goods damaged by fire I was obliged to sell them at 66⅔% less than cost. I received $175 for them; what was the cost?
3. A grocer sold 12 ducks for $20.06, which was 18% above cost. What did they cost?
4. A broker received $4151.25 to invest in hardware after deducting 2½% commission. What was the amount of the investment?
5. Find the amount of $7963 for 2 years 5 months and 17 days, at 7½%.

LESSON LV.

1. A man sold a piano for $780, by which a gain of 30% was realized. What was the cost?
2. A man sold goods for $675, by which 11½% was lost. What did they cost?
3. I sold 20 firkins of butter for $336, which was a gain of 20%. What did it cost per pound?
4. To gain 33⅓% how should goods be marked that cost $2.70? $3.60? $4.50? $7.37½? $8.10?
5. A commission merchant paid $650.25 charges on a ship-load of fruit, and his commission was 1¼%; he remitted to the shipper $2476.75. What were the gross receipts?

LESSON LVI.

1. A cargo of wheat being damaged in transportation to the amount of 20% was sold for $75500. What was its cost?
2. The duty on silk being 15%, transportation 10%, and profit 25%, what was the cost of silk selling for $4.70 per yd.?

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3. If $\frac{1}{4}$ of a chest of tea is sold for the cost of 1 chest, what is the gain per cent. on the part sold?
4. If $12\frac{1}{2}\%$ of an article is wasted in transportation, and the remainder is sold at $33\frac{1}{3}\%$ profit, what is the gain per cent?
5. To $\frac{4}{5}$ of a foot add $\frac{3}{7}$ of a rod.
Find the sum of $\frac{7}{8}$ of a mile and $7\frac{1}{4}$ rods.

LESSON LVII.

1. A merchant sold a stock of goods for \$753.64, which was 17% less than cost. What was the cost?
2. A man exchanged a farm for dry goods valued at \$10000, which was 25% more than twice the cost of the farm. What was the cost of the farm?
3. If I retail goods at 25% gain, and wholesale them at 8% less than I retail them, what is my gain per cent. at wholesale?
4. I sent to my agent in Chicago \$9470.25, with which to buy a stock of hardware, after deducting his commission of $1\frac{3}{4}\%$. How much did he invest?
5. Find the amount of \$1000 for 3 mo. at $11\frac{1}{9}\%$.

LESSON LVIII.

1. A grocer sold 3 hogsheads of sugar, each containing 540 pounds, at $8\frac{1}{3}$ ct. per lb., thereby losing $16\frac{2}{3}\%$. What was the cost of the whole?
2. Having goods in stock a long time I sell them at a loss of 20%. What shall I mark goods that cost me \$.75? \$1.75? \$1.25? \$.95?
3. An agent purchased 3750 bu. of wheat at \$1.50 per bu. What was his commission at $1\frac{1}{4}\%$?
4. What per cent. of 900 is 180?
What per cent. of $\frac{1}{2}$ is $\frac{1}{4}$?
5. If a family use 4 bu. 2 pk. of potatoes in one month, in what time will they consume 674 bu. 2 pk.?

LESSON LIX.

1. A man sold two city lots at \$3600 each, on one gaining $12\frac{1}{2}\%$, and on the other losing $12\frac{1}{2}\%$. What was his gain or loss?
2. To gain 40% how should I mark goods that cost \$1.10? \$3.75? \$5.71$\frac{1}{2}$? \$6.70? \$8.62$\frac{1}{2}$?

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3. If I sell an article for $\frac{4}{5}$ its cost what per cent. do I lose?
4. A man bought $2520 worth of goods and sold $\frac{1}{3}$ at a profit of 30%, and the remaining half at a loss of $16\frac{2}{3}$%. What was his gain?
5. From $6\frac{3}{4}$ cwt. take $35\frac{1}{2}$ lb.
From $\frac{1}{3}$ of a mo. take $\frac{2}{3}$ of a week.

LESSON LX.

1. What must be the price-mark of an article costing $1.50, in order to make an abatement of 10%, and yet make 25% profit?
2. A man received only 70% of the amount of a note for $1250, that had run 2 yr. 7 mo. 20 da. at 10%. What amount did he receive?
3. A horse and carriage were sold at a profit of 20%, which was a gain of $150. The horse having cost 50% less than the carriage, what was the cost of each?
4. A merchant sold a quantity of flour for $6636, thereby gaining $18\frac{1}{2}$%. What was the cost of the flour?
5. A man invested $10000 in mining and $20000 in railroad stock. From the sale of the first he realized 40%, and from the sale of the latter he lost 20%. What was his loss or gain?

LESSON LXI.

NOTE.—To find the value of stock when at an advance or discount.

1. What must be paid for 50 shares of Nickel Plate stock at a premium of 4%, if the par value be $100 per share, and brokerage $\frac{1}{4}$%?
2. What is the cost of $8964 worth of stock in a Dakota gold mine at 12% above par, brokerage $\frac{1}{4}$%?
3. A man exchanged 25 shares of Delaware and Hudson stock, worth 8% above par, for 35 shares of Western Union at 19% below par, and paid the difference in cash. How much cash did he pay?
4. What number increased by 22% of itself is 11773?
5. A farmer sold 780 sheep, which was 75% of his flock. How many sheep had he before selling?

LESSON LXII.

1. I bought 50 shares of $75 each, of railroad stock at 2% *discount*, and sold it at $2\frac{1}{4}$% advance. How much did I *gain?*

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2. A broker exchanged $2800 of railroad stock at 6% discount, for 24 shares of bank stock at 4% premium, receiving the difference in cash for his services. What was his fee?
3. My income this year is $8008, which is 48% less than it was last year. What was it last year?
4. A merchant bought goods and paid 5¾% of the purchase price for freight, when he found that the goods had cost him $5287.50. How much did he pay for his goods?
5. What is the market value of 120 shares of stock in the Fifth National Bank of Chicago, at 1¼% advance?

LESSON LXIII.

1. What will 56 shares of N. Y. C. R. R. stock cost at 8½% above par?
2. If mining stock sell at 7½% below par, what will be the cost of 18 shares at $100 each?
3. What is the market value of 78 shares of Michigan Central at 4½% below par?
4. Cloth costing $2.80 per yard was found to be damaged. What must be the asking price that an abatement of 20% can be made and still cover the cost?
5. A note for $750 was given, to be paid in 1 yr. 7 mo. 21 da., with interest at 6%. What was the amount due at the expiration of the time?

LESSON LXIV.

1. What is the market value of 200 shares in a coal company, of $150 each, at 6¼% above par?
2. What will $2480 of stock in a lead mine cost at 4½% above par, brokerage ½%?
3. I bought 200 shares, of $150 each, of telegraph stock, at a premium of 10½%, brokerage ¼%. What did they cost me?
4. A broker charged 1½% for negotiating a loan with which 75 acres of land were purchased. The sum paid the broker, including $5.25 for necessary papers, was $77.25. What did the land cost an acre?
5. 16⅔% of ⅜ of an article is how many per cent. of ⅝ of it?

LESSON LXV.

NOTE.—To find how much stock may be purchased for a given sum.

1. How many shares of Rock Island Railroad stock, at 20% *above par, can* be purchased for $11760?

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2. I invested $7830 in Central Pacific stock at 13% below par. How many shares did I purchase?
3. I sold 50 shares in Western Union at 8% discount, and received $3450. What was the par value of each share?
4. If I sell goods for $300 that cost me $500, what per cent. do I lose?
5. A stock dealer bought 200 head of cattle at $50 per head, and sold them for $15000. What was the gain per cent.?

LESSON LXVI.

1. I sold several shares in the Goodrich steamer line at 10% discount, and received $3420. How many shares did I sell?
2. How many shares, at 4½% discount, can be bought in a Lake Superior mine for $9359?
3. How many shares, at 7% discount, can be purchased in a Black Hills silver mine for $4836?
4. A merchant wishing to sell out a stock of goods offered them for $24380, which was 8% less than cost. What was the cost of the goods?
5. A broker received $3218.50 to invest in real estate, after deducting his commission of 2½%. If he paid $20 per acre, how many acres did he purchase?

LESSON LXVII.

1. I invested $4680 in stock at 16⅔% below par. How much did I purchase?
2. A man invested $48840 in silver mine stock at $1.10½, brokerage ½%. How much stock did he buy?
3. I invested $228000 in bank stock at 13¼% premium, brokerage ¼%. How many shares of $100 each did I buy?
4. Having invested a certain amount in land and in wheat, I sold the former for $3500 at 40% profit, and the latter for $9800 at a loss of 30%. What was the amount invested?
5. If from a hogshead containing 63 gallons 16⅔% is wasted and ¼ of the remainder sold, what per cent. of the whole yet remains?

LESSON LXVIII.

1. I invested through a broker $77760 in stock quoted at 7½% *premium*, brokerage ½%. How much did I purchase?

An agent received $25500 to invest in bank stock at $.84½,

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brokerage $\frac{1}{4}\%$. How many shares of $100 each did he purchase?

When I. C. R. is quoted at $94\frac{3}{4}$, how much stock can be bought for $17860, brokerage $\frac{1}{4}\%$?

A broker receives $6457.50 to invest in cotton at $10\frac{1}{4}$ cents a pound, after deducting his commission of $2\frac{1}{2}\%$. How many pounds did he buy?

What is the amount of $5680 for 75 days at 1% a month.

LESSON LXIX.

NOTE.—To find what income any investment will produce.

What will be A's yearly income if he invest $7722.40 in United States 5's of '81 at 98%, brokerage $\frac{1}{4}\%$?

How much more will a man receive to invest $9120 in United States 5's extended at 114%, than in United States 4's at 112%?

A man invests $8800 in Chicago City 6's at 110%. What will be his yearly income?

A lawyer collects a debt, takes 4% for his fee, and remits the balance, which is $592.80. What was the debt and what was the fee?

What is the quotient of $\frac{1}{4}$ of $9\frac{3}{5} \div \frac{8}{11}$ of 15 divided by $\frac{\frac{3}{5} \text{ of } \frac{1}{3} \text{ of } 2\frac{1}{2}}{\frac{1}{4} \text{ of } 19\frac{1}{2}}$?

LESSON LXX.

What will be a man's yearly income if he invest $6650 in Chicago City Railway 5's at 95%?

How much will a man receive yearly if he invest $5900 in Cook County 7's at 118%?

In a school the number absent is 5% of the number registered, and the attendance is 2850. What is the membership and how many are absent?

4. A man wills 25% of his property to his wife, 50% of the remainder to his son, and what was then left, which was $2400, to found a library. What was the value of the property and what was the share of each?

5. Find the amount of $8000 for 2 years 5 months 12 days at $7\frac{1}{2}\%$.

LESSON LXXI.

1. What is my yearly income if I invest $55120 in United States 6's at $105\frac{1}{2}\%$, brokerage $\frac{1}{4}\%$?

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2. How much stock at a premium of 7¼%, brokerage ¼%, can be bought for $36550?
3. What will be my yearly income if I invest $36750 in New York Central 6's at 87½%?
4. I exchanged 100 shares of mining stock of $150 each, worth 8% premium, for bank stock at 90%. How many shares of $100 each did I receive?
5. ⅛ of 1⅛ is 17½% of what number?
   49 gal. 1 pt. is 3% of what quantity?

LESSON LXXII.

1. A man owning 70 shares of mining stock, of a par value of $100 each, will receive how much, a dividend of 9% being declared?
2. What income will be received by investing $13490 in railroad 4% stock, purchasable at 95%?
3. How much stock at a premium of 12½%, brokerage ½%, can be bought for $10170?
4. I bought bonds at 110 and sold them at par, thereby losing $1200. How many bonds of $1000 each did I buy?
5. What will be the amount at 6% of $3460, borrowed from a minor 15 yr. 9 mo. 20 da. old, to be paid when he is of age?

LESSON LXXIII.

NOTE.—To find what sum must be invested to obtain a given sum.

1. What sum must be invested in Chicago City 7's, purchasable at 114%, to obtain a yearly income of $770?
2. When the Chicago City Railway 5's are 8% below par, what sum must be purchased to secure an annual income of $800?
3. If I sell 90 shares of Michigan Central stock at 92%, and invest enough of the proceeds in United States 6's at 115 to yield an annual income of $300, and buy a farm with the remainder, how much will the farm cost me?
4. $(.25 \times 17.5) \div (.5 \text{ of } 1.75) \times 100 - .0087 \div 1.2 = ?$
5. I sold 40 cords of wood at $4.50 per cord, and received in payment oats at $\$\frac{2}{10}$ per bushel. How many bushels did I buy?

LESSON LXXIV.

1. What sum must be invested in Pacific Railroad 6's of 1895 at 118%, to secure an annual income of $600?

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What sum must be invested in United States 5's extended at 108%, brokerage ¼%, to receive annually $2025?

A commission merchant sells 400 bbl. of flour at $6.43¾ and remits the net proceeds, $2510.62½. What is his rate of commission?

A broker charges 2½% commission and 3½% for guaranteeing payment. If his sales are $18693.75, how much does he retain?

Find the amount of $640.40 for 10 months 7 days at 10½%.

LESSON LXXV.

What sum must be invested in United States 4½'s of 1886 at 94½%, brokerage ½%, to obtain an income of $1800?

If United States 6's of 5-20 are quoted at 95½%, what amount must be invested in them to give a yearly income of $4740, brokerage ¼%?

How much must I invest in New York 6's at 103% to secure an annual income of $3600?

If I sell 540 shares of $100 each of United States 5-20's at 110%, and invest in stock at 90% that is paying an annual dividend of 5½%, how will it affect my income?

A gentleman deposited $2250 in a bank; at one time he drew out 18%, at another 15% of the remainder. How much had he left in the bank?

LESSON LXXVI.

How many shares of bank stock must I own to receive $1260 from a declared dividend of 12%?

If the profits of a railroad are 4½% semi-annually, how many shares of $100 each must a stockholder own who received $1548 yearly?

A man owns a house and lot valued at $28500, which rents for $200 a month, the taxes and insurance being 1¼% on its valuation. If he sell it at its valuation and invest the amount in United States 6's at 94¾%, brokerage ¼%, how will it affect his income?

A broker bought 64 shares of $50 each in the Electric Light Company at 112½, and sold them at 125. How much was gained?

A man bought land for $672.84, to be paid for in 2 yr. 6 mo. 20 da., with interest at 7%. What sum of money was *necessary to cancel* the debt?

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LESSON LXXVII.

NOTE.—To find what per cent. the income is of the investment when stock is purchased at a given price.

1. What per cent. on my investment shall I receive by purchasing United States 5's of '81 at 115%?
2. What per cent. on his money will a man receive annually if he invest in United States 6's of '81 at 98%?
3. What sum must be invested in Electric Light 5% bonds, purchasable at 98¼%, brokerage ¼%, to secure an annual income of $500?
4. Change to common fractions, 2.0035, .010, .2002, 14.3, $60.0\frac{1}{10}$.
5. If 1.75 tons cost $11.37, what will 23½ tons cost at the same rate?

LESSON LXXVIII.

1. What is the rate of income upon money invested in Missouri 5's at 105%?
2. I purchased New York 6's at 5% below par. What is the income on the investment?
3. I purchased United States 5-20's of 1881 at 108%. What is the income on the investment?
4. What is the interest on a note of $1640, from April 16, 1878, to Jan. 10, 1879, at 7%?
5. A man having failed in business paid his creditor $3500 on a debt of $5000. What per cent. did his creditor lose?

LESSON LXXIX.

1. What per cent. on his money will a man annually receive who purchases United States 6's at $1.02½%?
2. What is the rate of income upon my money invested in United States 4½'s of 91 at 95%?
3. What per cent. on the investment does 5% stock pay if bought at 75%?
4. A mining company with a capital of $348200 clears $27856. What rate of dividend can it declare?
5. A man paid $362.60 to have an ice-house filled, that was 24 ft. 6 in. long, 18 ft. 6 in. wide, and 16 ft. high. Allowing *10 lb. to* a cu. ft. what did the ice cost him per pound?

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LESSON LXXX.

1. What per cent. will stock yield which pays 6% dividends, if bought at a discount of 15%?
2. Which is the more profitable, and how much, to buy New York 6's at 66⅔%, or bonds which pay 8%, purchasable at par?
3. Which is the better investment, 6% stock bought at ¾ its par value, or 8% stock purchased at par?
4. A man sold a horse and carriage for $675, and received in payment 40 lb. salt at 1½ ct. per pound, 80 bbl. flour at $5.50 per bbl., and the remainder in cloth at $.16⅔ per yd. How many yards did he receive?
5. What is the value of 25 sovereigns in United States money? What is the value of 50 francs in United States money?

LESSON LXXXI.

NOTE.—To find the price at which stock must be purchased to obtain a given sum?

1. What must I pay for New York 6's that my investment may yield 10% annually?
2. What must 1 pay for United States 4's of 1907 that my investment may yield 5% annually?
3. If I buy at $5 and sell at $10, what per cent. do I gain? If I buy at 33⅓ cents and sell at $1, what per cent. do I gain?
4. For what must I sell a horse that cost me $300 to gain 40%? I bought a horse for $300 and sold it for $250. What per cent. did I lose?
5. Find the amount of $987 for 11 months at 6%?

LESSON LXXXII.

1. At what rate of discount must I buy United States 5-20's of 1881 that I may secure 8% annually on the investment?
2. What must I pay for New York 6's that my investment may yield 8% annually.
3. An agent invested $26750 in Illinois Central stock, which was selling at 7% advance. How much did he purchase?
4. A man bought 40 shares, of bank stock, of $50 each at 4% discount, and sold it at 3½% gain. What was his profit?
5. I invested $78771 in railroad stock at 7% discount. How much *stock* did I purchase?

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LESSON LXXXIII.

1. How much must I pay for 6% stock to realize 7½% on my investment?
2. At what price must I purchase 10% stock so that it may yield the same income as 5% stock purchased at 80%?
3. What is the market value of 8% stock when I receive 7% on my investment?
4. A speculator invested $256200 in railroad stock at 91¼%, brokerage ¼%. How many shares of $1000 each did he buy?
5. How many pounds in 88.5 quintals of fish?
   What decimal part of a ton is ¼ of 45½ lb.?

LESSON LXXXIV.

1. How much premium must I pay on 12% stock to realize 9% on my investment?
2. A man owning 50 shares of $150 each in bank stock, paying a semi-annual dividend of 4½%, sold his interest at par and invested in 6% bonds at 80%. Did he gain or lose annually, and how much?
3. What sum must I invest in stock at par, paying an annual dividend of 11½%, to have a yearly income of $3680?
4. I own 40 shares of $50 each in a stock company which declared a dividend of 8½%. If I invest my profits in coal at $5 per ton, how many tons can I buy?
5. ($2520 × 3.49) ÷ 20.94 − ($1700 ÷ 13.60) = ?

LESSON LXXXV.

INSURANCE.

1. What will it cost to insure a building valued at $12000, at ½%, and contents valued at $20000, at ¾%?
2. An elevator contains 11360 bu. of wheat, worth $1.30 per bu., which is insured for ¾ of 1½% on ¾ of its value. If the wheat is destroyed how much will the owner lose?
3. A house and furniture valued at $7000 are insured at 3½% on $\frac{7}{10}$ of their value. What is the premium?
4. The wheels of a locomotive are 5 ft. 2½ in. in circumference and make 8 revolutions a second. How much time will be required to run 50 miles?
5. *What is the value of 21 bu. 3 pk. 2 qt. of corn at 62½ cents a bushel?*

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LESSON LXXXVI.

1. What will it cost to insure a house valued at $4000 at $\frac{3}{4}\%$, and the furniture valued at $1000 at $\frac{1}{2}\%$?
2. The owner insured a steamer valued at $24500 for $\frac{4}{5}$ its value, and its cargo valued at $24000 for $\frac{5}{6}$ its value, the former at $\frac{3}{4}$ of 1%, and the latter at $\frac{5}{8}$ of 1%. What was the premium?
3. A shipment of cotton valued at $84000 and insured for $\frac{3}{4}$ of 1% upon $\frac{3}{4}$ its value, was lost at sea. What was the actual loss to the owner?
4. What will 77200 bricks cost at $5.75 per 1000?
5. What will 93180 feet of boards cost at 9.62\frac{1}{2}$ per 1000?

LESSON LXXXVII.

1. I insured a house for $4500, and the furniture for $\frac{2}{3}$ as much; the rate for both being $\frac{3}{10}\%$, what was the premium?
2. A cargo of wheat worth $1500 was insured at $1\frac{1}{2}\%$. What was the premium?
3. What will be the premium for insuring $25500 on a school-house, at $2\frac{1}{2}\%$?
4. The net proceeds of a sale were $6044.94, the commission $203.06. What was the rate of commission?
5. What is the exact time in days from October 7, 1879, to August 28, 1882?

LESSON LXXXVIII.

1. What is the premium when a house is insured for $5000, at $1\frac{1}{2}\%$, for one year?
2. What is the premium on a cargo of steel worth $35000 which is insured at $\frac{1}{2}$ of $\frac{5}{6}$ of 2%?
3. A farmer raised 3150 bu. of grain; he sold $\frac{3}{10}$ of it at one time and $\frac{2}{3}$ of the remainder at another. What per cent. of his crop had he left?
4. Find the amount of the following note when due:

$460.50. St. Louis, Mo., Aug. 9, 1880.

Six months after date, for value received, I promise to pay L. S. Kent, or order, four hundred sixty $\frac{50}{100}$ dollars, with interest at 6%.

HENRY T. STONE.

5. What is $16\frac{2}{3}\%$ of 1 mi. 2 fur. 16 rd. 3 yd.?

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LESSON LXXXIX.

1. When the rate of insurance is 1½%, and the premium $62.52, what is the value of the property insured?
2. The premium for insuring goods was $14.63, the rate 3½%. For what amount were they insured?
3. At an annual rate of 4% what amount can be insured for $631.60?
4. What is the cost of 7368 pounds of hay at $9.75 a ton, and 99652 lb. of iron at $10.50 per ton?
5. What will 10 cord feet and 24 cubic feet of wood cost at $7.50 per cord?

LESSON XC.

1. If it cost $54.60 to insure a house for ⅞ its value at 1½%, what is the house worth?
2. A man paid $198.40 insurance at 3½% on a cargo of coal, to cover ⅝ its value. What was its value?
3. For what sum must a stock of groceries, worth $8316, be insured at 1% to cover the value and the premium?
4. A merchant bought 97.2 yd. of cloth for $480, and made it into suits requiring 8.1 yd. for each suit. For how much must each suit be sold to gain 33⅓%?
5. What is the value of 70 shares in the Illinois Central Railroad at 120%?

LESSON XCI.

1. A ship valued at $69480 was insured against loss for its full value at 3½%, and the cargo valued at $83085 for 4½%. What must be the amount of insurance to include the premium?
2. What is the amount of insurance on a house worth $29775, at the rate of 75 cents per $100, the amount of insurance to include the premium?
3. What is the cost of 20 shares of railroad stock at 7½% above par?
4. An agent received $10710 with which to purchase a stock of groceries, after deducting his commission of 2%. What sum did he lay out?
5. April 15, 1880, I have a note which has run 3 yr. 9 mo. 15 da. What is its date?

LESSON XCII.

1. What is the rate of insurance if $32 is paid for an insurance of $1600?

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2. If $21 is paid for an insurance of $1680, what is the rate?
3. A merchant paid $180 to insure a stock of goods worth $6000. What was the rate?
4. Find the amount of the following note:

$375.25. Cleveland, O., June 1, 1882.

On the fifteenth day of Nov., 1882, for value received, I promise to pay to L. M. Day, or order, three hundred seventy-five $\frac{25}{100}$ dollars, with interest at 8%.

A. P. SIMIONS.

5. What is the difference in longitude between two places whose difference in time is 1 hr. 45 min. 30 sec.?

LESSON XCIII.

TAXES.

1. A tax of $4862.50 is to be raised in a town; the taxable property is $486250. What is the assessment on a dollar?
2. A certain village having taxable property amounting to $64530, raises a tax of $2259.90; there are 270 polls at $1.20 each. What is the tax on a dollar, and what is A's tax whose real estate is valued at $2000, and who pays for 1 poll?
3. What is $3982 worth in the Union Pacific at 9½% above par?
4. A dealer bought $240 worth of tea. For how much must he sell it to gain 25%?
5. What is the interest on $480.80, at 8%, for one year?

LESSON XCIV.

1. A tax of $1834 is to be assessed on a town in which there are 320 polls assessed at 80 cents each; the amount of taxable property is $105200. What is the tax on one dollar, and what is A's tax whose property is valued at $2500, and who pays for one poll?
2. A certain town is taxed $1075; the property is valued at $70000, and there are 50 polls which are assessed at 50 ct. each. What per cent. is the tax, and what is A's tax whose property is valued at $1000, and who pays for 1 poll?
3. An insurance company took a risk of $450000 at ⅛%, reinsured with another company $5000 at $\frac{2}{100}$%, and $25000 with another at 1½%. How much premium did it clear above what it paid?
4. $\$250 - \$170\frac{20}{100} - \$14\frac{1}{4} + \$\frac{12}{16} = ?$
5. $(3 \div 18\frac{3}{4}) - (2 \div 31\frac{1}{4}) =$ what decimal?

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LESSON XCV.

1. The tax assessed in a town is $1980; its property is $56000, and it contains 300 polls which are assessed at $1 each. What is the tax on one dollar, and what is a person's tax whose property is valued at $2500 and who pays for 2 polls?
2. A country school was supported by a rate bill; the teacher's wages amounted to $175; the other expenses were $125; the public money was $100, and the days' attendance was 8000. What must A pay who sends three children 100 days each?
3. A commission agent sold merchandise amounting to $4620.30. How much should he remit after taking 2½% for selling and 1½% for guaranteeing the payment?
4. I paid $121.50 for wood at $6.75 per cord. How many cords did I purchase?
5. Find the amount of $750.50 for 11 months 11 days at 6%.

LESSON XCVI.

1. The number of polls in a town is 45, assessed $1.25 each; the taxable property is $788750; they are to build a school-house at an expense of $3900. What is the tax on a dollar, if the cost of collecting is 2½%?
2. The tax assessed in a town for building is $3960; for other improvements $1610; the property is valued at $139250. What per cent. is the tax, and what is a man's tax whose property is valued at $4000?
3. A merchant bought 3 pieces of cloth, averaging 35 yards, for $525. For how much must it be sold per yard to gain $105?
4. A man's salary is $8000 a year, and he lays up 37½% of it. How much does he spend?
5. An agent sold 400 yards of cloth at 50 cents a yard, and deducted 5% commission. What amount did he send the owner of the goods?

LESSON XCVII.

1. A certain town wishes to build a school-house by a tax of $8652.55. The taxable property of the town is valued at $1146650, and there are 1252 polls, each to pay 50 cents. What will be A's tax, whose property is valued at $42663, and who pays for 3 polls?
2. At what rate must $1190000 worth of property be assessed to *raise* a tax of $5660, if there are 800 polls at $1.12½ each, *and what* will be the tax on property valued at $16400?

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3. The premium of $3747.04 was paid for insuring a ship and cargo worth $136256. What was the rate?
4. An attorney charged $13.60 for collecting a note at 8%. What was the face of the note?
5. What per cent. is realized upon an article sold at $2\frac{1}{4}$ times its cost?

LESSON XCVIII.

1. A tax of $18145 is to be raised in a town, including cost of collection at $4\frac{1}{2}\%$. There are 850 polls to be assessed at $1.10 each; the real estate is valued at $1105843, and the personal property at $249032. What will be A's tax who pays for 3 polls and has property to the amount of $37800?
2. What will be B's tax, who pays for 2 polls and whose property is valued at $24800?
3. A man pays an annual premium of $196.50 for insuring his house and contents valued at $13100. What was the rate?
4. A man had $10000 in a bank and drew out 12% of it, then 20% of the remainder, and afterward deposited a sum equal to 20% of what still remained. How much had he then in the bank?
5. What part of a square rod is $\frac{6}{2720}$ of $4\frac{1}{2}$ times $\frac{4}{36}$ acres?

LESSON XCIX.

1. How much tax will a person pay whose property is assessed at $148200, if he pay $2\frac{3}{4}\%$ city tax, $1\frac{1}{2}\%$ school tax, and $\frac{3}{4}\%$ state tax?
2. What would be the taxable valuation of property which was taxed $1\frac{1}{2}\%$ to raise $7650, and 4% for collecting, there being 330 polls at $1 each?
3. A man paid $20 to insure a house worth $5000. What was the rate?
4. What is the market value of stock paying 5%, when the investment yields $6\frac{1}{4}\%$?
5. Reduce 18 hr. 12 min. to the fraction of a day?

LESSON C.

CUSTOMS.

1. What is the duty at 15% on 120 yd. of velvet, invoiced at $4.75 per yd.?

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2. A dealer imported from Geneva, 50 watches invoiced at $110 each, and 20 invoiced at $150 each? What was the duty at 35% ad valorem?
3. What is the duty on 20 chests of tea, each containing 120 lb., tare 8 lb. per chest, at 10 ct. a pound?
4. For what sum must a policy be issued to cover the value of a house worth $16506, furniture $\frac{2}{3}$ the value of the house, and also include the premium at $1\frac{1}{4}$%?
5. $642.75. Chicago, Ill., Jan. 1, 1880.

For value received, on demand I promise to pay to L. M. Stiles, or order, six hundred forty two $\frac{75}{100}$ dollars, with interest at 7%.

MARK L. HALLY.

What was the amount due March 11, 1882?

LESSON CI.

1. What is the duty at 14% on 440 yards of silk, invoiced at $2.25 per yard?
2. What is the duty at 25% on 25 barrels of brandy, each containing $31\frac{1}{2}$ gallons, invoiced at $3.50 per gallon?
3. I imported 28 barrels of wine, invoiced at $2 per gallon. If $\frac{1}{2}$% was allowed for leakage, what was the duty at 25%?
4. My agent sells a quantity of merchandise; after deducting $2\frac{1}{2}$% of the amount of sales the net proceeds were $1622.40. What was the amount of the sales?
5. A note of $1230.88 was given October 1, 1881, due June 13, 1883. What was the amount due, interest 6%?

LESSON CII.

1. What is the duty on 40 pieces of broadcloth, each piece containing 38 yd., invoiced at $3.75 per yd., at 20%?
2. What is the duty on 500 boxes of Havana cigars at 30%, invoiced at $1.50 per box?
3. A public hall is to be built in a town by a tax of $1000; the property in the town is valued at $190000; the tax is to be collected with the yearly tax at $2\frac{1}{2}$% for collecting; the other assesment is $365; there are 300 polls at $1.50 each. What is the tax on a dollar?
4. What is the amount of a note of $2880, from August 16, 1881, to June 19, 1882, at 6%?
5. I sent my agent $4725 to invest in land, after deducting his *commission* of 5%. How many acres did he buy at $25 *per acre?*

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LESSON CIII.

PARTIAL PAYMENTS.

1. $1000. Albany, N. Y., Jan. 1, 1882.

One year after date I promise to pay Cyrus Cook, or order, one thousand dollars for value received, with interest at 6%.

GEO. RANSOM.

Indorsed as follows: Mar. 1, $150; June 1, $250; Oct. 1, $300. What was due Jan. 1, 1883?

2. A liquor dealer imported 150 doz. qt. bottles of champagne, at $15 per doz.; 30 casks Bourbon whisky, each containing 45 gallons, at $2 per gallon. 4% of the champagne and 5% of the whisky were lost by breakage. What was the duty, the rate on champagne being $5 a doz. and on the whisky 50 ct. a gallon?

LESSON CIV.

1. A note for $6080, at 7%, dated Jan. 8, 1880, had the following indorsements: Apr. 3, 1880, $250; July 13, 1880, $50; Oct. 8, 1880, $1000; Jan. 2, 1881, $147.24; Aug. 15, 1881, $900.

How much was due January 8, 1882?

LESSON CV.

1. Date of note, Feb. 10, 1879; face, $150.50; rate per cent. 6;

Payments:	Jan. 15, 1881, $8.50;
Apr. 5, 1880, $25;	Aug. 20, 1882, $50.25;
Dec. 10, 1880, $15;	Jan. 14, 1883, $10.

How much remained due June 1, 1883?

LESSON CVI.

1. $640. Chicago, Ill., Jan. 20, 1875.

On Sept. 15, 1880, for value received, I promise to pay Henry Smith, or order, six hundred and forty dollars with interest at 10% per annum.

JOHN RANDALL.

On this note were the following endorsements:

Aug. 4, 1876, $ 40;	Jan. 21, 1878, $150;
Mar. 10, 1877, $210;	Dec. 20, 1879, $ 10.

What remained due on this note Sept. 15, 1880?

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LESSON CVII.

1. $4920. Chicago, Apr. 10, 1881.

On demand, for value received, I promise to pay Manly Morton, or order, four thousand nine hundred and twenty dollars, with interest at 6%.

IRVING FRENCH.

Indorsed, Aug. 20, 1881, $ 980;
Dec. 26, 1881, $ 800;
May 2, 1882, $1500.

What was due Aug. 20, 1882?

LESSON CVIII.

1. $5500. St. Louis, May 1, 1881.

Two years after date, for value received, I promise to pay German French, or order, five thousand five hundred dollars, with interest at 5%.

WM. FRENCH.

Indorsed, Oct. 1, 1881, $1400;
Feb. 7, 1882, $ 45;
Sept. 13, 1882, $ 580.

What was due May 1, 1883?

LESSON CIX

1. $7800. St. Paul, Oct. 22, 1881.

On demand, for value received, we promise to pay Manly Tooker, or order, seven thousand eight hundred dollars, with interest at 7%, payable annually.

S. FRENCH AND EMMONS.

Indorsed, Feb. 25, 1882, $2000;
Jan. 1, 1883, $ 200;
Apr. 1, 1883, $ 75;
July 10, 1883, $1200;
Dec. 26, 1883, $ 20;
May 12, 1884, $ 100;
Sept. 29, 1884, $ 50.

What was due December 1, 1884?

LESSON CX.

1. $5640. Cleveland, O., May 7, 1879.

For value received, three years after date I promise to

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pay J. Smith & Co., or order, five thousand six hundred forty dollars, with interest at 9%.

GEO. RIDE.

Indorsed, June 25, 1880, $1000;
Nov. 1, 1880, $ 400;
Jan. 12, 1881, $1500;
Sept. 4, 1881, $1200;
Jan. 10, 1882, $ 200.

What was due May 7, 1882?

LESSON CXI.

What principal at 6% will gain $100.38 in 3 yr. 6 mo.?

What sum invested at 8% will pay an annual income of $609.64?

What sum put at interest for 1 yr. 10 mo. 18 da. at 6% will gain $11.074?

The duty on 2500 yd. of silk was $750, at 30% ad valorem. What was the invoiced price per yd., and what must be the selling price per yd. to clear 25%?

A note of $78.70, dated May 10, 1878, and bearing interest at 8%, was paid July 9, 1880. What was the amount paid?

LESSON CXII.

TIME, RATE, INTEREST, TO FIND PRINCIPAL.

What is the principal which, being on interest 3 yr. 7 mo. 24 da. at 10%, gained $359.16?

What principal will gain $8.256 in 1 yr. 10 mo. 28 da. at 6%?

What principal will be required to gain $48 in 75 da. at 2% a month?

A merchant's profits in 1882 were $38313, which was 19% less than in 1881. What were his profits in 1881?

Give the amount of the following bill: 16824 ft. boards at $35 per M, 1581 feet scantling at $16⅔ per M, 22000 lath at 25¢ per C, and 6848 shingles at $7½ per M?

LESSON CXIII.

I receive $850 semi-annually, it being at the rate of 8½% interest per annum on a mortgage. What is the amount of the mortgage?

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2. What sum will produce $64.804 in 1 yr. 1 mo. 18 da., at 7½% interest?
3. I have 5% bonds which yield me $625 semi-annually. What amount of bonds do I hold?
4. The net proceeds of a shipment of 24000 lb. of cotton, were $3282 after deducting a commission of 5½%, and $120 for other charges. What did it sell for per pound?
5. If a boy buy 8 bu. of nuts at $5¾ a bu., and retail them at 20 cts. a qt., what is his gain?

LESSON CXIV.

1. I paid $67.496 interest, at 6%, on a note dated Aug. 9, 1877, and paid Dec. 27, 1879. What was the face of the note?
2. I receive a quarterly income from rents of $456, which is 12% annual interest on the valuation of the property. What is the property worth?
3. What is the value of ¼ of ⅛ of a mill, if a person who owns ⅘ of it sell $\frac{1}{16}$ of ⅞ of his share for $1890?
4. A grocer by selling molasses at 75 ct. a gallon made 25% on the cost. What was the cost of 12 hhd. of 63 gallons each?
5. On the 15th day of Sept., 1882, for value received, I promise to pay to John Rent, or bearer, two hundred seventy-five and $\frac{20}{100}$ dollars, with interest at 7%.

MARTON BURCH.

Galena, Aug. 8, 1881.

What was the amount due September 15, 1882?

LESSON CXV.

TIME, RATE PER CENT., AMOUNT, TO FIND THE PRINCIPAL.

1. The amount is $228.28½, time 2 yr. 9 mo. 27 da., rate 10%. What is the principal?
2. What principal will amount to $980.334 in 3 yr. 6 mo. 18 da. at 8%?
3. The amount is $1021.2244, time 6 yr. 9 mo. 15 da., rate 7%. What is the principal?
4. What is the duty on 580 yd. of cloth, invoiced at $4.50 per yard, at 19%?
5. By selling horses at $80 each I lost 20%. What did they *cost me?*

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LESSON CXVI.

1. What principal will amount to $219.25 in 1 yr. 9 mo. at 5½%?
2. It required $9456.25 to pay a loan at 5% for 2 yr. 3 mo. What was the sum loaned?
3. I sold a house and lot for $5155, which included 10½% interest on the money invested in it 2 yr. 9 mo. before. What did I pay for it?
4. A block valued at $984000 is insured at 1¼%. What is the premium?
5. From a piece of cloth containing 47¾ yd. I sold ¾ of a yard, 1½, 9, 7.25 and 19.125 yd. What per cent. of the whole remained?

LESSON CXVII.

1. What principal will amount to $917 in 1 yr. 8 mo. at 5½% per annum?
2. What sum put at interest at 4½% for 90 days will amount to $6472?
3. It required $475.20 to cancel a note for 3 yr. 11 mo. 15 da. at 6%. Required the face of the note.
4. My quarterly income from the United States 6's is $432. If purchased at par what amount did I invest?
5. An agent sold a house and lot for $15700, and the owner received $15464.50 as the net proceeds. What was the rate of commission?

LESSON CXVIII.

PRINCIPAL, TIME, INTEREST GIVEN, TO FIND RATE PER CENT.

1. If $57.024 is paid for the use of $1056 for 10 mo. 24 da., what is the rate per cent.?
2. A man borrowed $1240 for 16 mo. and paid $99.20 for the use of it. What was the rate of interest?
3. Principal $2, time 100 years, and interest $7. What is the rate per cent.?
4. If my income is $2250 per annum, what sum invested at 6% will pay it?
5. A commission merchant receives 2090 lb. of butter worth 25 ct. per lb., and $3680 in cash. The net proceeds of the butter and the cash to be invested in a shipment of lard to New York. His charges being 4½% for both selling and *investing, what will be* the amount invested?

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LESSON CXIX.

1. A person owning a building worth $8246 rents it for 20 months for $1236.90. What per cent. does he receive?
2. If I pay 39.93\frac{1}{3}$ for the use of $1250 for 7 mo. 20 da., what is the rate of interest?
3. What is the rate of interest when $62.50 is paid for the use of $800 for 1 yr. 3 mo.?
4. I realized at a rate of 12% per annum by selling a farm for $8424, which I had owned 2 yr. 6 mo. What did I pay for it?
5. I sent to a New York buyer $840 to be invested in ginghams at 21 ct. per yard, after deducting his commission of 2$\frac{1}{2}$%. How many yd. did I receive?

LESSON CXX.

1. At what rate per annum of simple interest will $640 triple itself in 8 years?
2. A man invests $4876.25, and receives from it an annual income of $585.15. What is the rate per cent.?
3. If I buy stock at 20% below par and receive a semi-annual income dividend of 4$\frac{1}{2}$%, what annual rate of interest do I receive?

This note is not negotiable.

4. May 9, 1881, for value received I promise to pay Guy Than six hundred and fifty dollars, with interest at 10%.

H. H. STONE.

Buffalo, New York, Apr. 17, 1878.

What was due May 9, 1881?

5. If a township 2$\frac{1}{2}$ mi. square be divided equally into 75 farms, what will be the size of each farm?

LESSON CXXI.

PRINCIPAL, INTEREST, RATE PER CENT., TO FIND TIME.

1. A man loaned $340 at 5%, and received $4.25 interest. How long was it loaned?
2. The face of a note was $1236, rate of interest 6%, and the interest $92.70. How long did it run?
3. How long will it take $300 to double itself, at 8% simple interest?
4. *What will* be my income from investing $50015 in United *States* bonds at $.87$\frac{1}{2}$, which pay 4$\frac{1}{2}$% interest?

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5. A broker received $6140 to invest in corn at 60¢ per bu., after deducting his commission of 2½%. How many bushels did he buy?

LESSON CXXII.

1. How long will it take $768 to amount to $962.56 at 8%?
2. In what time will $768 produce $105.60, interest at 5½%?
3. How long will it take $2400 at 5% to gain as much as $800 at 6% in 2 yr. 6 mo.?
4. How much would a man receive for sawing and repiling 2 piles of wood, each 45 ft. long, 8 ft. wide and 8 ft. high, if he charged $.87½ a cord?
5. A merchant bought 400 yd. of print at 8 cents per yd., and marked it 25% above cost, but afterward sold it at a reduction of 20% on his asking price. What were his profits?

LESSON CXXIII.

1. How long a time would it require for $1250 to amount to $1512.50 at 7%?
2. What time will be required for $816 to gain $340 at 7½%?
3. In what time will $284.60 gain $153.68¾ at 2% a month?
4. A merchant offered some goods for $1170.90 cash or $1206 payable in 30 days. Which was the better offer for the customer to accept, money being worth 10%?
5. If I employ a broker to buy 60 shares of railroad stock which is 18% below par, brokerage ¼%, how much will my stock cost me?

LESSON CXXIV.

COMPOUND INTEREST.

1. What is the compound interest of $2480 for 4 years at 6%?
2 What is the compound interest of $3480 for 5 yr. at 7%?
3. What is the compound interest of $4362.50 for 4 yr. at 7%?

4. $7380. N. Y., August 20, 1880.

Two years after date I promise to pay James Smith, or order, seven thousand three hundred and eighty dollars, with interest at 6%, value received.

JOHN JONES.

Endorsed, Aug. 20, 1881, $1680.
Dec. 26, 1881, $ 400.
May 2, 1882, $1200.

How *much* remained due Aug. 20, 1882?

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LESSON CXXV.

1. Find the compound interest of $300.50 for 2 yr. 7 mo. at 8%.
2. Find the compound interest of $636.50 for 2 yr. 4 mo. at 7%.
3. Find the difference between the simple and the compound interest of $3160 for 4 yr. 8 mo. 6 da. at 6%.
4. A man bought 54 bbl. of oatmeal for $249.75 and sold it at a gain of $57.44¼. What was his gain per cent.?
5. If an article is sold at ⅞ of its cost what is the loss per cent.? ⅞ of 392 is $\frac{7}{11}$ of how many times 9?

LESSON CXXVI.

1. Find the compound interest of $100000 for 8 yr. at 10%.
2. Find the compound interest of $6062.50 for 1 yr. 8 mo. 18 da. at 6%, payable quarterly.
3. What sum of money will produce $36.96 compound interest in 1 yr. 6 mo. at 8%?
4. How long will it take $480 to triple itself at 2% a month?
5. $10633 was divided among 3 persons. B received ⅓ more than A, and C 1⅛ times ½ the sum of A's and B's. What amount did each receive?

LESSON CXXVII.

Commercial Discount.

1. I bought a bill of goods amounting to $675 on 90 days' time, but was offered a discount of 10% if I paid cash, which I accepted. How much did I pay?
2. A merchant buys a bill of goods amounting to $1200 on 60 days' time, with the understanding that he shall be allowed a discount of 10% if payment is made in 10 days, and 6% if made in 30 days. What amount will pay the bill in 10 days? What in 30 days?
3. I am offered a discount of 15% on an article marked $18. How much would it cost me?

   The retail price of a bill of goods was $220, but being damaged I bought them at a discount of 30% and 5% off for cash. What amount did I pay?
4. What is the cash value of a bill of goods amounting to $3275.50 at 10% discount and 6% off for cash?
5. A man gains $375.25 on the sale of a house and lot. His *gain being* 5%, what was the selling price?

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LESSON CXXVIII.

1. A speculator sold 2500 bbl. of flour at $7 per bbl., with a discount of 10% and 2½% off for cash. How much did he receive for it?
2. What is the cash value of a bill of groceries amounting to $652.40 at 15% discount and 2½% off for cash?
3. I paid $9000 for an article for which I was allowed 10% discount from retail price. What was the retail price?
4. A merchant bought 2 boxes of boots for $308, and sold them at a loss of 12½%. What was the selling price?
5. Express 10 mi. 4 fur. 20 rd. 2 yd. decimally, making the mile the unit.

LESSON CXXIX.

TRUE DISCOUNT.

1. What is the present worth of $2140, payable in 1 yr., when the rate of interest is 7%?
2. What is the present worth of $2298.40, payable in 1 year and 6 months, when the rate of interest is 7%?
3. What is the present worth and true discount of a note for $4160, payable in 6 months, when the rate of interest is 8%?
4. A man bought a house for $32500, and rented it for $1950 a year. What per cent. did it pay?
5. What will be the amount due on a note of $7890 from Aug. 16, 1881, to June 19, 1882, at 7%?

LESSON CXXX.

1. What is the present worth and true discount, at 6%, of $2180, payable in 1 year and 6 months?
2. I sold merchandise for $2950, payable in 2 years 3 months. What is the present worth of the debt at 8% discount?
3. What is the present worth of a draft of $5175, payable at 60 days' sight, when interest is 9%?
4. Two men engaged in business with $9125 each; one gained 20% and the other lost 20% the first year. What was the amount each man had at the close of the year?
5. At $60.30 per thousand what will be the cost of 5984 ft. of rosewood?

   What will be the cost of 4897 pounds of butter, at $18 per hundred?

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LESSON CXXXI.

1. What is the present worth of $862.71, payable in 2 years 7 months 18 days, at 6%?
2. What is the present worth of $737.28, payable in 1 yr. 10 mo. 24 da., at 8%?
3. What is the cash value of goods amounting to $1380.45 at 10% discount?
4. At what rate per annum of simple interest will $1 double itself in 8 years?
5. A man sold 40 lb. of tea at 75¢ per lb., and 60 lb. of coffee at 20¢ per lb.; on the tea he gained 25% and on the coffee lost 25%. What was his gain?

LESSON CXXXII.

1. What is the present worth of $520 to be paid in 8 mo., discounting at the rate of 8%?
2. What is the present worth and true discount of $681, payable in 1½ years, when money is worth 9%?
3. A note of $502.55, due in 1 yr. 6 mo. 15 da. without interest, is worth how much at the time it is given, money being worth 6%?
4. A's money is to B's as 2½ to ¾, and the sum of the interests on ⅓ of each, for 2 yr. 4 mo. 20 da. at 6%, is $8944. What amount of money has each?
5. Cincinnati being 84° 27′ west longitude, and the Sandwich Islands 155° west longitude, when it is 20 min. past 1 o'clock A. M. at the Sandwich Islands, what time is it at Cincinnati?

LESSON CXXXIII.

1. A offered B $755 in cash for a lot, or $847 payable in three years without interest; B accepted the latter. Did he gain or lose, money being worth 7%?
2. A offered a farm for $2400 cash, or for a note of $2750, secured by a mortgage on the farm, due in 1 year 8 months without interest. B bought the farm, accepting the latter offer. Did B gain or lose, and how much, money being worth 10%?
3. B sold some land for $1440, payable in 3 years 4 months. What is the present worth of the debt, discounted at 6%?
4. What part of £2 is 1¼ pence?
   What part of 2 lb. Troy is 16 pwt. 3 gr.?
5. Reduce ¾ of a minute to the fraction of a day.
   What part of 8 rods is 20 feet?

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LESSON CXXXIV.

What is the present worth of a note for $438.463, due in 2 years 6 months at 7%?

What is the present worth of a note for $2009, on which $950 is to be paid in 10 months and the remainder in 1 year 3 months, at 6% discount?

Which is worth the more, $624 cash or $694.60 in 18 mo., money being worth 10%?

Reduce $\frac{3}{4}$ of a hhd. to integers.

Reduce $\frac{5}{8}$ of a bu. to integers.

Reduce $\frac{4}{13}$ of a week to lower denominations.

Reduce $\frac{1}{20}$ of a square yard to the fraction of a foot.

LESSON CXXXV.

What are the present worth and true discount of $2925.56, payable in 1 yr. 6 mo. at 6%?

A man sold a stock of goods for $863.80 on 6 mo. credit; at the end of 2 months he accepted $840 and receipted the bill. What was the rate per cent. of discount?

If the date of a note for $640 is September 4, 1879, and the time of payment July 19, 1883, what amount will be necessary to pay it 1 yr. 4 mo. after date, discount 8%?

If I buy cloth at 1\frac{7}{8}$ per yd. and sell it at 1\frac{1}{4}$ per yd., what per cent do I lose?

If $648\frac{37}{144}$ is the minuend and $179\frac{27}{36}$ the remainder, what is the subtrahend?

LESSON CXXXVI.

A man was offered 480000 ft. of lumber at 8\frac{1}{2}$ per M for cash, or for $2120 to be paid in 9 mo. and $2464 to be paid in 1 yr. 6 mo. Did he gain or lose by accepting the latter offer, and how much, money being worth 8%?

I bought 204 bbl. of flour at $7 per bbl. on 60 days credit. How much cash would have settled the bill, money being worth 6%?

Which is the better investment, and how much, $6400 yielding a semi-annual income of $288, or $9600 with a yearly interest of $792?

At what rate per annum will $600 triple itself in 7 yr.?

A purchased a section of land and sold $120\frac{10}{32}$ A. to B, $84\frac{33}{64}$ A. to C, and $90\frac{27}{40}$ A. to D. How many acres had he remaining, and what did he receive for the land sold if it averaged $5 per acre?

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LESSON CXXXVII.—RATIO.

1. What part of 42 is 7? Of 63 is 9?
2. What part of 132 is 11? Of 72 is 9? Of 144 is 24? Of 500 is 25?
3. What is the ratio of $9\frac{5}{8}$ to 77? Of $\frac{3}{11}$ to $\frac{14}{15}$? Of $1\frac{7}{8}$ to $19\frac{1}{7}$?
4. I bought hardware to the amount of $3080 on 6 mo. credit, and at the end of two mo. sold it at an advance of $12\frac{1}{2}\%$ on purchase price, and paid the debt. Money being worth 8% how much did I gain?
5. The sum of two numbers is $987\frac{47}{560}$, their difference is $127\frac{13}{80}$. What are the numbers?

LESSON CXXXVIII.

1. What is the ratio of £2 10s. 5d. to £12 12s. 1d.?
   What is the ratio of 2 hours to 1 day?
2. What is the ratio of 9 T. 10 cwt. 63 lb. 2 oz. to 1 T. 18 cwt. 12 lb. 10 oz.?
   The consequent is $2\frac{1}{4}$, the antecedent is $\frac{7}{24}$. What is the ratio?
3. What is the ratio of $12\frac{3}{8}$ to $15\frac{1}{3}$? Of $\frac{8\frac{3}{5}}{17\frac{1}{3}}$ to $\frac{8\frac{3}{5}}{18}$?
4. A man received two notes: one for $613, due in 4 mo. 10 days; another for $875.70, due in 8 mo. 15 da., and $447 in cash. He immediately discounted the notes at 6%, and through an agent invested the entire amount in tobacco at 20 ct. per lb., after deducting his commission of 2%. How many pounds were purchased?
5. Find the value of $\frac{10\frac{1}{3} \div 2\frac{1}{7}}{39\frac{3}{5} \div 16\frac{8}{15}}$.

LESSON CXXXIX.

1. What is the relation of 10.4 to 2.6?
   The antecedent is 47, the ratio is 8. What is the consequent?
2. The consequent is $7.33\frac{1}{3}$, the ratio is $\frac{1}{15}$. What is the antecedent?
   The ratio is $4\frac{1}{2}$, the antecedent is $\frac{1}{10}$ of 3. What is the consequent?
4. The ratio is 8, the consequent is 2 lb. 7 oz. 9 pwt. 10 gr. What is the antecedent?
   The ratio is 12, the consequent 1 rd. 3 ft. 7 in. What is the antecedent?
4. *A speculator* lost $1064.70 by selling wheat $7\frac{1}{2}\%$ below cost. *What did* it cost him?

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5. The capital of a firm is $450000. A owns $\frac{2}{5}$ of it + $25000; B owns $\frac{3}{10}$ of the remainder — $3500, C owns $\frac{3}{8}$ of what then remained, and D the remainder. How much does D own?

LESSON CXL.

1. If the antecedent be $\frac{1}{3}$ of $\frac{1}{8}$, and the consequent .75, what is the ratio?
   Find the reciprocal ratio of 68 to 51.
2. What is the reciprocal ratio of 15 min. to $4\frac{1}{2}$ hr.?
   What is the inverse ratio of $\frac{4}{15}$ to $\frac{8}{21}$?
3. If the antecedent is $4\frac{1}{2}$, and the ratio is $3\frac{1}{3}$, what is the consequent?
4. I sold a stock of goods for $2968, on the following terms: $\frac{1}{4}$ cash and the remainder in one year. To what amount of cash in hand was the selling price equal, money being worth 6% per annum?
5. A man had 3 fields of wheat; the first yielded 160 bu. which was $\frac{3}{5}$ of the yield of the second and $1\frac{7}{8}$ the yield of the third. How many bushels in all?

LESSON CXLI.

PROPORTION.

1. 24 : 10 :: ( ) : 25.
   84 : 140 :: 3 : ( ).
2. 144 : ( ) :: 201 : 75.
   ( ) : 24 :: $1\frac{1}{2}$: $2\frac{1}{4}$.
3. 2 : ( ) :: 14 : 168.
   365 : 500 :: 75 : ( ).
4. Add $\frac{2}{3}$ of a mile and $\frac{1}{4}$ of a rod.
   From $\frac{1}{2}$ of a mile take $\frac{2}{3}$ of a foot.
5. I borrowed $1240 for 8 mo. and paid $49.60 for the use of it. What per cent. interest did I pay?

LESSON CXLII.

1. 90 : 30 :: 15 : ( ).
   12 : 40 :: 42 : ( ).
2. 500 : 365 :: $102\frac{1}{2}$: ( ).
   27 : 54 :: 90 : ( ).
3. ( ) : 25 :: 16 : 100.
   6 : 4 :: ( ) : $2\frac{1}{2}$.
4. What is the present worth of a note for $12423, payable in 2 *mo.*, *at* 6% discount?

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5. $2500. Chicago, May 1, 1880.

Twenty months after date I promise to pay Marson French, or order, two thousand five hundred dollars, with interest at 5%, value received.

Indorsed, Oct. 1, 1880, $350.
Feb. 7, 1881, $ 22½.
Sept. 13, 1881, $240.

What was the balance due January 1, 1882?

LESSON CXLIII.

Simple Proportion.

1. 16⅔ lb. of tobacco can be bought for $3½; what quantity can be bought for $634.46?

   If 1¼ yd. cost $1⅜, what will 81 yd. cost?

2. If 1⅝ barrels of vinegar cost $5 1/13, how much will 1¾ barrels cost?

   If 1½ of 2⅔ acres cost $24600, how much is ⅝ of 1⅞ acres worth?

3. A man bought a house for $2600 and received $143 rent annually. What per cent. was it of the investment?

   What sum must be put at 7% interest to gain $126 in 6 months?

4. What is the present worth of $9135, due in 3 months at 6% discount?

5. A merchant pays $400 for insuring $16000 on his goods. What is the rate per cent.?

LESSON CXLIV.

1. If a pasture will feed 12 cows 182 days, how long will it feed 42 cows?

   If a pole 11 ft. 4 in. in height cast a shadow of 12 feet, how high is a spire whose shadow measures 306 feet?

2. If 3⅝ barrels of flour cost $22, what will 100 bbl. cost?

   If 12 pounds of flour cost $.60, what must be paid for 356 barrels?

3. A man invested $8460 in western land and afterward sold it at 4⅓% advance. How much did he receive for it?

4. What is the amount of a note for $8750, from Oct. 1, 1882, to June 13, 1883, at 6%?

5. A man gave $1250 a year toward the support of an orphan *asylum*. What sum must be invested at 6% interest to *pay it*?

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LESSON CXLV.

1. When 12 bbl. of flour cost $87 what will be the cost of 684 barrels?

If 27 bushels of apples cost $87½, how many bushels can be bought for $438¾?

2. What is the value of a farm, when $\frac{8}{16}$ of it sells for $3840?

If 20 men can do a piece of work in 10 days, how many days will 5 men require to do the same?

3. A speculator sold $6500 worth of wheat at a gain of $480. What amount must he sell to gain $1200?

If 5.25 yd. of cloth cost $3.78, what will be the cost of 262.5 yd. at the same rate?

4. If $\frac{9}{16}$ of 4 times my age is 144 years, what is my age?

5. What is the amount of $874, at 8%, from June 6, 1873, to Dec. 21, 1882?

LESSON CXLVI.

1. How many yd. of lining 1 ft. 10 in. wide will be required to line 7 yd. of cloth 3 ft. 8 in. wide?

2. If I sell 72 bu. of wheat for $107 that cost $89, what is gained on 540 bu. at the same rate?

3. What is the value of 15 cords 6 cd. ft. of wood, if 5 cords 2 cord ft. are worth $32?

If 8 T. 4 cwt. 48 lb. of hay are worth $82.24, what will 50 T. 16 cwt. 54 lb. cost?

A merchant bought goods to the amount of $1680.80 on 9 months' credit. How much money would have paid the bill at the time it was made, money being worth 8% per annum?

What decimal part of an acre, is a lot 242 ft. long and 72 ft. wide?

LESSON CXLVII.

Compound Proportion.

If 14 horses eat 70 bushels of oats in 25 days, how many bushels will 30 horses eat in 42 days?

If it cost $120 to build a wall 80 ft. long, 7 ft. high, and 1½ ft. thick, what will it cost to build a wall 240 ft. long, 14 ft. high and 1¼ ft. thick?

I was offered a span of horses and carriage for $900 cash or $975.20 in 8 mo. without interest; I accepted the latter. *What was the result,* money being worth 8%?

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4. What principal, at 7%, will amount to $1318.80 in 8 months?
5. If 100 tons of coal, at $4.50 long-ton weight, are sold at $6 per short ton, what is the gain?

LESSON CXLVIII.

1. What sum of money on interest for $1\frac{1}{2}$ years at 8%, is worth as much as $1080 that is on interest 10 mo. at 7%?
2. If a family of 5 persons spend $150 in 3 weeks, how long would $700 last a family of 12 persons?
3. What will be my income from investing $15900 in United States 6's at 6% premium?

$490. Lincoln, Neb., Jan. 9, 1879.

4. Two years and six months after date, for value received, I promise to pay to Charles Rowan, or order, four hundred and ninety dollars, with interest at 10%.

PARK DUNN.

What was due at maturity?

5. A and B are partners in business; A's capital equals $\frac{4}{7}$ of B's, and they lose $6370. What is the loss of each?

LESSON CXLIX.

1. If it cost $12 to deliver 16 tons of coal 3 miles, what will it cost to deliver 200 tons $1\frac{1}{2}$ miles?
2. What is the cost of $45\frac{1}{2}$ yd. of cloth $\frac{7}{8}$ yd. wide, if 54 yd. $1\frac{1}{4}$ yd. wide cost $5.40?
3. When the days and nights are of equal length, and it is sunrise on the 1st meridian, on what meridian is it noon?
4. How many perches of masonry is there in a wall 198 ft. long, $7\frac{3}{4}$ ft. high and 2 ft. thick?
5. What is the length of a timber 8 in. by 9 in. and containing 9 cu. feet?

LESSON CL.

1. If the interest of $3000 for 3 yr. 8 mo. 25 da. is $672.50, what is the interest of $200 for 6 months at the same rate?
2. If a bin 14 ft. long, $2\frac{1}{2}$ ft. wide, and 2 ft. deep contain 56 bushels, how many bu. will a bin contain that is 9 ft. long, $4\frac{4}{5}$ ft. wide, and $3\frac{3}{4}$ ft. deep?
3. What is the difference between the true discount of $7490 for 1 year, and the interest for 1 year on the same amount at 7%?

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4. A tax assessed by a certain town is $3960; its property is valued at $112000, and it contains 600 polls, which are assessed $1 each. How much is a man's tax whose property is valued at $3000, and who pays for 2 polls?
5. An agent received $928.86 with which to purchase cloth at $8 per yard, after deducting his commission of 2½%. How many yards did he purchase?

LESSON CLI.

1. If 32 men by working 9 hours a day can in 24 days dig a ditch 190 rods long, 12 feet wide and 9 feet deep, how many men in 32 days of 8 hours each will be required to dig a ditch 380 rods long, 7 feet wide and 6 feet deep?
2. A merchant sold a stock of goods for $6156, which was 12½% advance. How much did it cost him, and what did the purchaser make in retailing the goods at 25% profit on his purchase price?
3. $1\frac{8}{1000} \div 18 + 63 \div 400 \times 10 - \frac{1}{8} =$ what decimal?
4. How many square feet of lumber in 50 boards, each 18 ft. long and 9½ in. wide?
5. What is the width of a pile of wood 64 ft. long, 10 ft. high, and containing 40 cords?

LESSON CLII.

1. An agent sold a quantity of furniture at auction on a commission of 10%. What amount must he have sold to have had remaining $8640 to invest in wool after deducting his purchase commission of 4%?
2. A tank 8 ft. deep, 14 ft. long, and 7½ ft. wide is ⅝ full of water. How long will it take to empty it, pumping at the rate of 4 gallons a minute?
3. From the sum of $346\frac{4}{5}$ and $127\frac{3}{4}$ take their difference?
4. What will it cost, at $10.75 per square of 100 feet, to slate a roof 50 ft. long and each of the two sides 20 ft. wide?
5. A and B commence business with a capital of $9594; A's interest equals ⅝ of B's; at the close of the year they are worth $12194. What is each one's share of the gain?

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PROMISCUOUS EXAMPLES.

QUERY.—*By what rule is each of the following Examples solved?*

1. An agent received $88704 to invest in pork. After deducting 5% commission, how many barrels did he buy at $8 per barrel?
2. A bin 8 ft. long, 3 ft. 2 in. wide, and 4 ft. high was filled with apples, 33⅓% of which were spoiled and the remainder were sold at $1 per bushel. How much was realized from the sale?
3. From a stick of timber 1 ft. 4 in. square at the end, 12½% of its length is sawed off and 74⅔ cu. ft. remain. What was the length of the timber?
4. An agent sold a farm for $6480, at a commission of 8¼%; $1540 worth of stock at a commission of 7%, and farming implements for $750.50 at a commission of 3½%. What was the amount of his commission?
5. I bought for a customer 2400 barrels of flour at $6.50 per barrel, commission 3½%, and sold it for $8.50 per barrel, commission 5½%, and invested the amount of my commission in cranberries at $9 per barrel. How many barrels did I buy?
6. A grocer bought 640 doz. eggs at 18¢ per doz., lost 50 doz. by breakage, and sold the remainder at 20% profit. What was the result of the trade?
7. If to $\frac{7}{12}$ of a number 50 be added, and from the sum ⅓ of the original number be subtracted, ⅛ of the remainder will equal 60. What was the number?
8. I sold flour at $.75 a barrel above cost and realized 12½% profit. If I had sold it at a profit of 18¾% what would have been the selling price per barrel?
9. Find the difference between 1 mi. 3 in., and 7 fur. 39 rd. 16 ft. 9 in.
10. A cargo of cotton worth $61120 was shipped from New Orleans to Liverpool. For how much must it be insured, at 4½%, to cover the value of the cotton and premium?
11. The sum of $28000 was divided equally between A and B. A's money increased at the rate of 10% per annum for 3 years and 6 mo. B's decreased at the same rate per annum for the same time. How much more then had A than B?

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12. On May 14, 1874, I sold my farm for $7500, receiving $3500 in cash, and a note for 3 yr. 6 mo. at 6%, secured by a mortgage that covered the balance. I immediately loaned the $3500 for the length of time the note had to run at 10%. At the expiration of the time I invested $10650 in real estate. How much more than the avails of the farm did I invest?

13. A Boston merchant imported 2400 yd. of Irish linen, for which he paid 1s. 8d. per yd. The duty being $.10 a yd., and the other expenses $46.70, for how much must he sell it per yd. to gain 20%?

14. Through the failure of a bank a man received 60% on a deposit of $25000. He immediately invested it in wheat and gained 216⅔%. What amount did he receive from the last transaction?

15. A man sold a horse and carriage for $800, thereby getting 25% less for the horse, and 25% more for the carriage than the cost. The selling price for the carriage was 66⅔% more than for the horse. What was the cost of each?

16. Which will cost the more and how much, to ship from Chicago 2500 bu. of corn by water at 5 cents per bu., or by rail at 10 cents per 100 lb.?

17. A man invested $6000 in merchandise, and added his gain to his capital each year for three years. The first year he gained 16⅔%, the second year 14⅔%, the third year 25%, and the fourth year he lost 40%. How much more had he at the expiration of the time than when he commenced?

18. A has 20% more sheep than B. How many per cent. less than A has B?

19. What equal number of 1½ pt. 1¼ qt. 1¼ gal. bottles can be filled from a hogshead containing 82 gal. 2 qt. of wine?

20. How many rods of fence will inclose an oblong field containing 20 acres, and whose width is 40 rods?

21. A buys a farm for $2000 and sells it to B at a gain of 20%. B sells it to C at a loss of 20%. What per cent. of A's gain is B's loss?

22. What will it cost to floor a hall 70 ft. by 36, with 9 inch flooring at $30 per M, allowing ⅛ for matching?

23. From a hogshead containing 132 gallons of wine and costing $396, 25% leaked out. For how much must he sell the remainder per gallon to lose only 10% on the investment?

24. A's salary is 33⅓% more than B's, and C's is 25% more than A's. They together receive $6000. What is the salary of each?

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25. If expressage is \$1½ per hundred, and 20 crocks of butter costing 20¢ per lb., the gross weight of which is 900 lb., are shipped, and the crocks, each weighing 5 lb., are returned at the same rate, what per cent. is realized by selling the butter at 35¢ a pound, the commission being 5% on the sales?

26. If a gallon measure is $\frac{1}{32}$ too small, how much will a milk dealer make who uses it dishonestly during a year, if he sell 240 gallons daily at 4¢ per qt.?

27. The difference in longitude between two points from which observations of the comet of 1882 were taken was 40° 20′. What was the difference in time?

28. A and B can excavate a cellar in 35 days; A can do ⅖ as much as B. How long will it take each to do it?

29. Of two numbers ⅜ of ⅞ of the larger equals the smaller, and their sum is 1908. What are the numbers?

30. What will it cost to dig a ditch 2 ft. deep and 1½ ft. wide around a lot 4 rd. long and 3½ rd wide, at 54 cents a cu. yard?

31. How many yd. of carpeting ⅝ yd. wide will carpet a room 30 ft. 3 in. long and 24 ft. 9 in. wide, deducting for border ⅜ yd. wide?

32. A commission merchant in Philadelphia having received 5840 gallons of New Orleans molasses, sells it at 55 cents a gallon. After deducting \$45.25 for freight, \$15.65 for storage, &c., and his commission, he remits to the shipper \$3070.80 as net proceeds of the sale. What was his rate per cent. commission?

33. A country merchant bought 4 cases of boots and shoes at \$75 each, at 10% discount and 5% off for cash; \$1200 worth of dry goods at 8½% off for cash, and groceries amounting to \$650.50 at 5% discount and 4% off for cash. How much money did he invest?

34. Give the numbers that must be added to the terms of the fraction $\frac{54}{171}$ to make it $1\frac{107}{187}$.

35. A merchant asked 25% more than cost for carpeting, but was compelled to sell it at 25% less than his asking price. For how much per yd. did he sell carpeting that cost him \$2 per yd.?

36. If a telegram could be sent from Pekin, China, 116° 27′ east longitude, at 7 o'clock 30 min. A. M., January 1, 1883, what would be the exact time and date of its receipt in Chicago, 87° 37′ west longitude, no allowance being made *for transit?*

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37. A merchant sold groceries to the amount of $984, ⅓ to be paid in 30 da., ¼ in 60 days, and the remainder in 90 da., with interest at 8% per annum. What was the entire amount paid?

38. Two numbers are to each other as 12 to 17½, and the less is 127.2. What is the greater?

39. A tank has a supply pipe that will fill it in 6⅔ hours, and a discharge pipe that will empty it in 22½ hours. In what time will it be filled if both are left open?

40. What time would be required for 10 men to mow 2 acres of land if 2 men can mow it in 3½ days of 8 hours each?

41. A merchant bought on 9 months credit 3 hhd. of sugar, each containing 212 lb., at 6⅔ ct. per lb., and sold it at 8 ct. per lb. on 6 mo. credit. What was his net gain, money being worth 8%.

42. How many kilometers does a person walk in two hours who takes 3 steps in a second, each ½ a meter in length?

43. A man owning ⅔ of a piece of property sold 14⅔% of his share to one man, 25% of the remainder to another, and $\frac{5}{16}$ of what then remained to another. What per cent. of what he had at first was his last remainder?

44. A certain village levies a tax of $6500 for schools, and $3100 for other expenses. The property in the village is assessed at $480000. For what is A's property assessed if his tax is $170.80?

45. I get $175 for selling goods, pay $50 freight and $25 storage. The goods cost $2500 and I sell them for $3500. What per cent. profit does the owner realize, and what was my rate per cent. for selling?

46. A rectangular field is 645.33 ft. long, and its length is 3 times its width. What is the distance around it in meters?

47. A buys an article for $1000 and sells it to B at a gain of 20%; B sells it to C at a loss of 20%. What per cent. of A's gain is B's loss?

48. I have $3200, gain 15% on it, lose 20% on what I then have, then gain 12½% on what I have left. What amount will I then have?

49. If I invest $6400 in railroad stocks at 80% and sell them at 10% premium, what do I gain? What per cent. do I gain?

50. What is the loss per cent. if ¼ of an article is sold for ⅔ its value?

51. For how much must a building, worth $21825, be insured, at 1½%, to cover both the value of the building and the *cost of the* premium?

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52. What must I ask for cloth costing $5 a yard, that I may deduct 20% from the asking price, and still make 20%?

52. What is the true discount and the present worth of $472, due in 2 years 6 months, at 6%?

NOTE.—For the convenience of schools that make this the dividing line between the Seventh and Eighth Grades, the lessons are numbered from 1.

BANKING.

NOTE 1.—To find the date of maturity when the time is expressed in months, count forward the number of calendar months, plus three days. When the time is expressed in days, count forward the number of days, plus three days.

NOTE 2.—To find the term of discount, count in days from date of discount to maturity. Change days to months by dividing by thirty when more than a month. When the number of days is less than 30, divide by 3 to reduce to the decimal of a month.

LESSON I.

Find the date of maturity of notes dated as follows:

1. May 3, to run 2 months. Jan. 7, to run 6 mo.
   March 25, to run 4 mo. June 12, to run 5 mo.
2. Apr. 21, to run 9 mo. Sept. 6, to run 8 mo.
   Aug. 9, to run 11 mo. Oct. 18, to run 7 mo.
3. Dec. 16, to run 10 mo. Nov. 9, to run 5 mo.
   Sept. 30, to run 6 mo. June 21, to run 2 mo.
4. What amount due in 2 yr. 4 mo., with interest at 7%, will cancel a debt of $495.20, due in 2 yr. 4 mo. without interest?
5. What is the present worth of a note for $600, bearing interest at 10%, due in 3 years 6 months, money being worth 6%?

LESSON II.

To find the date of maturity of notes dated as follows:

1. July 18, to run 60 da.
   Feb. 9, to run 30 da.
   Sept. 5, to run 90 da.
   Dec. 6, to run 45 da.
2. Feb. 20, to 1882, to run 120 da.
   Jan. 7, to run 15 da.
   Apr. 15, to run 180 da.
   Aug. 11, to run 75 da.

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3. Nov. 1, to run 90 da.
Apr. 30, to run 150 da.
Jan. 29, 1881, to run 45 da.
Sept. 27, to run 120 da.

4. What must I pay for Chicago City 7's that my investment may yield 10% annually?

5. Which is worth the most, $900 cash down, $936 in 6 mo., or $954 payable in 9 mo., money being worth 8%?

LESSON III.

To find the Term of Discount.

1. Due May 3, discounted March 5.
Due March 12, discounted Jan. 30.
Due Dec. 27, discounted July 15.
Due Apr. 10, discounted Feb. 15.

2. Due Nov. 12, discounted June 5.
Due Aug. 19, discounted Jan. 2.
Due Nov. 10, discounted Aug. 4.
Due June 21, discounted Apr. 7.

3. Due Nov. 4, discounted Aug. 9.
Due Sept. 30, discounted July 27.
Due Feb. 4, 1882, discounted Dec. 2, 1881.
Due Dec. 19, discounted Aug. 20.

4. What principal at 1½% a month, will in 4 mo. yield twice the amount of interest that $237.90 will yield in 2 yr. 6 mo. at 6%?

5. A cotton broker lost $798 by selling a quantity of cotton 9½% below cost. How much would he have received if he had sold it at 9½% above cost?

LESSON IV.

Find the Maturity and the Term of Discount.

1. Date, Dec. 20, 1876, to run 60 da., discounted Jan. 23.
" May 15, 1876, to run 2 mo., discounted June 12.

2. " June 16, 1878, to run 9 mo., discounted Oct. 24, 1878.
" Dec. 20, 1876, to run 60 da., discounted Jan. 3, 1877.

3. " Sept. 27, 1880, to run 8 mo., discounted Feb. 2, 1881.
" March 15, 1882, to run 90 da., discounted May 4.

4. What is the cash value of a bill of goods amounting to $2482.50, at 10% discount and 6% off for cash?

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5. $620. Chicago, Sept. 4, 1881.

Apr. 10, 1882, for value received I promise to pay Henry Brand, or order, six hundred twenty dollars, with interest at 6%. JOHN HENRY.

Mr. Brand indorsed the note and then had it discounted, Jan. 10, 1882, at 6% true discount. What were the proceeds? $6033.3366+

LESSON V.

TO FIND THE MATURITY, TERM OF DISCOUNT AND DISCOUNT.

Find the bank discount of the following:

1. $ 385 for 3 mo. at 6%.
   $8984.15 for 30 da. at 6%.
   $ 765.30 for 65 da. at 6%.
   $7318.69 for 2 mo. 15 da. at 6%.
2. $ 318.25 for 2 mo. 15 da. at 6%.
   $ 824.17 for 3 mo. 28 da. at 8%.
   $4484.15 for 3 mo. 18 da. at 7%.
   $2184.39 for 3 mo. 10 da. at 7%.
3. $ 630.50 for 4 mo. 20 da. at 7%.
   $ 472.80 for 9 mo. 10 da. at 5%.
   $3148.54 for 6 mo. 15 da. at 8%.
   $ 748.30 for 8 mo. 20 da. at 7%.
4. If I gain $385.20 by investing in stocks at 80%, and selling at 10% premium, what amount do I invest? $1027.20
5. What is the difference between the true discount and the interest of $350.40 for 1 yr. 6 mo. 12 da. at 9%?

LESSON VI.

1. Give the maturity and term of discount of a note dated July 19, 1880, to run 90 days, and discounted Sept. 1.
2. Of a note dated May 3, 1880, to run 2 mo. 15 da., and discounted July 10.
   Of a note dated Dec. 4, 1879, to run 4 mo. 20 da., and discounted Jan. 18, 1880.
3. Of a note dated Dec. 27, 1881, to run 120 da., and discounted March 7, 1882.
   Of a note dated Nov. 8, 1880, to run 8 mo. 20 da. and discounted Feb. 10, 1881.
4. If the annual rent of a house valued at $8640 is $720, what is the value of a house renting at the same rate for $550 for the same time?
5. *The interest* on a note for 3 yr. 6 mo. at 7% was $157.29. *What* was the face of the note?

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LESSON VII.

BANK DISCOUNT.

1. Find the proceeds of a note of $340, payable in 90 days, discounted at 7%.
2. Of a note of $280.50, payable in 45 days, discounted at 9%.
3. Of a note of $2000, payable in 120 days, discounted at 7½%.
4. I gave a note for $920, to run 2 yr. and 6 mo.; at the end of one year I took it up at 10% true discount. What amount was required?
5. A builder was offered $2400 worth of brick on 3 mo. credit, or a discount of 2½% if he paid cash. Money being worth ¾% a month did he gain or lose by paying cash?

LESSON VIII.

1. What are the bank discount and proceeds of a note:
   Of $160 for 5 mo. 27 da. at 7%?
   Of $200 for 2 mo. 21 da. at 6%?
2. Of $500 for 8 mo. 9 da. at 7%?
   Of $300 for 4 mo. 21 da. at 5%?
3. Of $700 for 30 da. at 6%?
   Of $380 for 5 mo. 27 da. at 7%?
4. A farmer sold 5 loads of hay, weighing respectively 1785½ lb., 2056¾ lb., 1926¼ lb., 2500 lb. and 2162½ lb., including the weight of the wagon, which was 950 lb. What did he receive for the hay at $7.50 per ton?
5. A man insures his store and contents at 1¾%, to include the premium, paying $294 for insurance. If the insurance on the premium was $5.14½, what was the value of the store and contents?

LESSON IX.

1. What are the bank discount and proceeds of a note:
   Of $ 480 for 5 mo. 27 da. at 7%?
   Of $ 400 for 2 mo. 21 da. at 6%?
2. Of $1000 for 8 mo. 9 da. at 7%?
   Of $ 600 for 4 mo. 21 da. at 5%?
3. Of $1400 for 30 da. at 6%?
   Of $ 756.80 for 30 da. at 12%?
4. What is the difference between the interest and the true discount of a note for $3051, for 1 yr. 8 mo. 21 da. at 6%?

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5. A quantity of merchandise was sold for $9430, which was 15% above cost. What would have been the gain per cent. if it had been sold for $10045? 22 1/2 /

LESSON X.

1. Give the bank discount and proceeds of a note for $1250, payable in 90 days at 7%.
2. What are the bank discount and proceeds of a note for $597.50, due in 60 days at 6%?
3. What are the bank discount and proceeds of a note for $2184.39, due in 4 mo. 11 days at 7%?
4. The interest on a note for $217.25, at 4%, was $28.96⅔. What was the time?
5. If I pay $4.68 for the use of $936 for 1 month, what is the rate per cent.?

LESSON XI.

1. What are the bank discount and proceeds of a note for $780, due in 9 days at 6%?
2. A note for $4032, payable in 8 mo., was discounted at bank at 8% What was the discount?
3. A note for $1239.60, payable in 6 mo. 15 da., was discounted at a bank at 6%. What were the proceeds?
4. What sum of money put at interest for 2 years 8 months will gain $21 at 6%?
5. A man bought 150 shares of stock in a mining corporation, at $25 each, at 3% discount, and sold them at 4½% advance. What was the gain?

LESSON XII.

1. A note of $540, dated May 9, 1880, and payable in 90 days, with interest at 6%, was discounted at bank June 14 at 8%. What were the proceeds?
2. What were the proceeds of a note of $420, dated Aug. 15, 1881, payable in 2 mo. 15 da., with interest at 6%, and discounted at bank Sept. 20?
3. A note of $2000, dated Aug. 19, 1880, due June 1, 1881, with interest at 6%, was discounted at bank Feb. 10, 1881. What were the proceeds?
4. A man owning ¾ of a tract of land sold 12½% of his share to one man, 20% of the remainder to another, and ⅓ of what

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then remained to a third party. What per cent. was the last remainder of what he had at first?

5. What sum must be invested in United States 4's, quoted at 119%, to secure an annual income of $4000?

LESSON XIII.

1. What are the bank discount and proceeds of a note for $897.20, due in 60 days at 8%?
2. Find the date of maturity, term of discount, and proceeds of the following:

468\frac{35}{100}$. St. Louis, July 27, 1880.

Three months after date I promise to pay to the order of W. Warner, four hundred sixty-eight dollars and thirty-five cents, for value received.

JOHN JONES.

Discounted at bank Aug. 16, at 6%.

3. $3480. Chicago, June 12, 1881.

Six months after date I promise to pay Field & Co., or order, three thousand four hundred eighty dollars, with interest at 6%, value received.

GEORGE FRENCH.

Discounted at bank Nov. 15, at 7%.

4. If the interest of $944 for a certain time, at 6$\frac{1}{2}$%, is $429.52, what is the length of time?
5. 33$\frac{1}{3}$% of 1764 is 16$\frac{2}{3}$% of what number?

LESSON XIV.

1. Required the face of a note, so that the proceeds may be:
   $3888 for 4 mo. 21 da. at 7%.
   $ 388 for 5 mo. 27 da. at 6%.
2. $ 195.20 for 3 mo. 15 da. at 8%.
   $ 980 for 4 mo. 21 da. at 5%.
3. $ 368 for 9 mo. 15 da. at 10%.
   $7776 for 4 mo. 21 da. at 7%.
4. A note of $1500, dated Feb. 4, 1881, and payable in 9 mo. with interest at 8%, was discounted at bank June 15, 1881, at 10%. What was the discount?
5. What principal will produce as much interest in 4 mo. 20 da. at 1$\frac{1}{2}$% a month, as will $380.40 in 2 yr. 3 mo. 18 da. at 6%?

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LESSON XV.

1. A man received $9250 as the proceeds of a note payable in 6 mo. 12 da., discounted at bank at 9%. What was the face of the note?
2. Wishing to borrow $800 at a bank by a note at 45 days, for what sum must the note be drawn that I may receive $800 in cash, after paying the discount at 8%?
3. For what sum must a note be drawn, payable in 3 mo., so that when discounted at bank at 12½%, the proceeds will be $3750?
4. A western merchant purchases in Boston a bill of boots and shoes amounting to $5620, and gives in payment a note payable in 30 days, with interest at 6%. If the note is immediately discounted at bank at 10%, what is the difference between the amount of the note when due, and the proceeds?
5. A cubic foot of water weighs about 62 lb. 8 oz. What will be the weight or pressure on 2½ sq. yd. at a depth of 22 fathoms?

LESSON XVI.

1. What is the face of a note at 30 days, the proceeds of which, when discounted at bank at 7%, are $2850?
2. For what sum must a note be drawn at 2 mo. 15 da., at 6%, so that when discounted at bank, the proceeds may be $1974?
3. For what sum must a note be drawn at 4 mo. 21 da., at 7%, so that when discounted at bank, the proceeds may be $1944?
4. What will be the proceeds of a note for $875.75, due in 90 da. with interest at 7%, discounted at bank?
5. A certain district paid $260 for teacher's salary, $68 for her board, $38.84 for fuel, and $5.16 for repairs; there was $60 public money, and the whole number of days' attendance was 4800. What was the rate per day, and how much was A's tax who sent one child 115 days?

LESSON XVII.

1. For what sum must a note be drawn so that when discounted at bank for 6 mo. 15 da. at 8%, the proceeds may be $348.94?

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2. What must be the face of a note payable in 10 months 6 days, so that, discounted at bank at 6%, the proceeds may be $417.34?

3. What sum payable in 6 months must be discounted at bank at 6%, to produce $1939?

4. Find the date of maturity, term of discount, and proceeds of the following note:

$1000. St. Louis, Feb. 5, 1880.

Two months after date we jointly and severally agree to pay to J. Harris, or order, one thousand dollars with interest at 6%, value received.

MORTON FRENCH,
MANLY IRVING.

Discounted at bank Feb. 21, at 10%.

5. Find the proceeds of a note for $490.64, due in 3 mo. 21 da., discounted at 7%.

LESSON XVIII.

EXCHANGE.

NOTE.—Cost = Face × 1 + Rate of Premium.
Cost = Face × 1 − Rate of Discount.

1. What is the cost of a draft for $200, exchange being $\frac{1}{4}$% premium?
For $ 540, exchange being $\frac{1}{4}$% premium?
2. For $1500, exchange being $1\frac{1}{2}$% premium?
For $1256, exchange being $1\frac{3}{4}$% discount?
3. For $3010.80, exchange being $\frac{1}{4}$% discount?
For $2600, exchange being $\frac{1}{8}$% discount?
4. What sum payable in 8 mo. 15 da., if discounted at bank at 9%, will give $2058.10?
5. If $638\frac{3}{5}\frac{3}{5}$ is the product and $98\frac{7}{2}\frac{7}{6}$ is the multiplicand, what is the multiplier?

LESSON XIX.

1. What is the cost of a draft on New York for $500, exchange being $\frac{3}{4}$% premium?
2. What is the cost of a draft on St. Louis for $1800, at $\frac{1}{4}$% discount?
3. What is the cost of a draft for $1520, exchange being $\frac{1}{4}$% discount?

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4. A merchant bought a bill of goods amounting to $3916. What must be the face of a note, payable in 4 mo. 3 da., so that discounted at bank at 6% it will exactly pay the bill?

5. An agent sold a house and lot at 25% gain, and after retaining his commission of 5% for selling, purchased with the proceeds 950 bbl. of flour at $8 per bbl., after deducting his 4% purchasing commission. What did the house cost?

LESSON XX.

1. What is the cost of a draft on New Orleans for $600, at ¼% discount?

2. If exchange is at ¼% premium, what will be the cost of a draft for $3000, payable in 30 days without grace, interest 6%?

3. A Chicago merchant wisnes to remit $3500 by draft to New York. What will be the cost of the draft, exchange being 1⅛% premium?

4. A note of $200, dated March 12, 1880, and payable in 6 mo. with interest at 5%, was discounted at bank May 1, 1880, at 8%. What were the proceeds?

5. A man sold 12 one-thousand dollar 5% bonds at $1.10, and with the proceeds purchased 4% bonds at $1.02. How did it affect his income?

LESSON XXI.

1. What will be the cost of a draft for $640, payable in 45 days after sight, exchange being 1⅛%, discount and interest 7%?

2. How much will be realized from the sale of a draft for $6000, at ⅛% premium?

3. How much will be realized from the sale of a draft for $2000, at ¼% discount?

4. What must be the face of a note, payable in 90 days, that the proceeds may be $39225 after deducting the bank discount at 7⅓%?

5. A person having $786 wishes to buy an equal number of yards of cloth, costing $3.25, $4.75, and $5.10 per yard. How many yards of each can he buy?

LESSON XXII.

NOTE.—To find the face of a draft which a given sum will purchase.

1. *What draft* may be purchased:
For $487.20, exchange being at 1½% premium?

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For $ 158.40, exchange being at 1% discount?

2. For $1909.50, exchange being at $\frac{1}{8}$% premium?
For $1500.24, exchange being at $\frac{1}{4}$% discount?

3. For $1006.25, exchange being at $\frac{5}{8}$% premium?
For 2340.37\frac{1}{2}$, exchange being at $1\frac{1}{4}$% discount?

4. What will be the cost of a draft for $6000, payable in 60 days after sight, exchange being at $1\frac{1}{2}$% premium and interest at 6%?

5. For how long a time is $1531 loaned at 6% to gain $367.44?

LESSON XXIII.

1. What must be the face of a draft to cost $4025 at $\frac{1}{8}$% premium?

2. What must be the face of a draft to cost $9343.30 at $\frac{1}{4}$% discount?

3. What must be the face of a draft for 90 days, costing $9222.14 at $\frac{1}{8}$% premium, interest off at 6%?

4. $1734.66. Chicago, Dec. 8, 1878.

For value received I promise to pay to James Field, or order, one thousand seven hundred thirty-four dollars and sixty-six cents on demand, with interest after three months.

JOHN CURTIS.

Indorsed, Apr. 16, 1879, $136.44,
Apr. 16, 1881, $238.00.
Jan. 1, 1882, $518.16.

What remained July 11, 1883?

LESSON XXIV.

1. What must be the face of a draft at 60 days, costing $3138.40 at $\frac{1}{8}$% discount, interest off at 6%?

2. What must be the face of a draft for $3533.46, payable at 30 days after sight at $\frac{1}{4}$% discount, interest off at 6%?

3. What draft may be purchased for $633.60, exchange being 1% discount?

4. A man owes $1948.75 on some city lots, which he can pay by giving his note payable in 4 months, discounted at bank at $7\frac{1}{2}$%. What must be the face of the note so that the proceeds will just cover the debt?

5. I sold $9449.55 of railroad stock at $3\frac{1}{2}$% true discount, and with a part of the proceeds bought 25 shares in the First

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National Bank of Chicago, at $100 per share at 2% discount, and with the remainder bought a farm. What did the farm cost?

LESSON XXV.

1. A sight draft bought at 1¼% premium cost $3240. What was the face?
2. How large a draft, payable in 30 days after sight, can be bought for $410.62, exchange being 1½% discount and interest 8%?
3. A man paid $737.78 for a draft drawn at 30 days sight. What was the face of the draft, exchange being at ¼% premium and interest 6%?
4. A man had a block of buildings which rented for $1362.50; he sold it for $27250, and invested the proceeds in United States 6's at 109%. Will his yearly income be more or less, and how much?
5. An importer paid $1300 premium on goods from Liverpool to New York, which was 1¼% on the amount insured. How much did he insure?

LESSON XXVI.

1. How large a sight draft can be bought for $529.10, exchange being 1¼% premium?
2. How large a sight draft can be bought for $1972,50, exchange being 1⅜% discount?
3. How large a draft payable 60 days after sight can be bought for $399.40, exchange being 1¼% premium and interest 8%?
4. Exchange being at a discount of 1¾%, what would be the cost in Atlanta, Ga., of a check for $2512, on Erie, Pa.?
5. A man owning a store had it insured for ⅘ its value, at 1¼%; the premium was $480. What was the value of the store?

LESSON XXVII.

1. A sight draft bought at 1½% premium cost $657.72. What was its face?
   What must be the face of a draft to cost $3478.05 at 1¾% discount?
2. What will be the cost of a 60-day draft, without grace, purchased for $2580.50, if the rate of exchange is ¼% premium and the rate of interest 6%?

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3. If New York exchange is at a premium of ¼% in Denver, what will a Denver merchant pay for a sight draft of $1500 on the Fifth National Bank of New York?

4. What is the difference between the true and bank discount on $48000 for 4 yr. 6 mo. at 6%?

5. The dimensions of 3 piles of wood are as follows: the first is 6 ft. 9 in. long, 6 ft. high and 4 ft. wide; the second 72 ft. long, 7 ft. 2 in. high and 4 ft. wide; and the third 40 ft. long, 3 ft. 6 in. high and 4 ft. wide. If it is all sold at $5.40 per cord, what amount will be realized?

LESSON XXVIII.

Foreign Exchange.

1. What is the cost in currency in New York of a sight draft on London for £620 10s. 6d., when exchange is 4.87 for a pound sterling and gold is at par?

2. How large a bill of exchange at sight on London, can be bought in Boston for $3641.25, exchange being at 4.85¼ and gold at par?

3. If sterling exchange is quoted at $4.89, what will it cost to purchase a sight draft on London for £678?

4. What is the difference in longitude between two places whose difference in time is 1 hr. 20 min.?

5. If an article is sold for ⅘ its cost, what is the loss per cent.?

LESSON XXIX.

1. If gold is selling at 106¼, and sterling exchange is 4.87½, what must be paid for a sight draft on London for £1600?

2. What will be the face of a sight draft on London, which is purchased in Philadelphia for $2403.921, sterling exchange being 4.87½ and gold at 106?

3. A New York merchant owes $7260.48 for linens purchased in Dublin, Ireland. For how many pounds sterling must he purchase a draft to pay the debt, exchange being at 8% premium?

4. A man purchased a farm, and to raise the money had two notes discounted at bank at 6%; one due in 6 months, the proceeds of which were $2908.50, and the other due in 9 mo., the proceeds of which were $5727. What was the amount of the faces of the notes?

5. What would be the cost of a piece of cloth containing 6480 square inches, at $4.75 a square yard?

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LESSON XXX.

1. Find the cost of a bill of exchange on Paris for 990 francs, at 5.15 francs to the dollar in gold.
2. Find the cost of a bill of exchange on Bremen for 3500 marks, quoted at 96¼ in gold.
3. Find the cost of a bill of exchange on Havre for 1395 francs, at 5.17½ francs to the dollar in gold.
4. At what rate per month will $4000 gain $240 in 90 days?
5. How many tons of ice can be packed in a building 13⅓ yd. long, 10 yd. wide and 6⅔ yd. high, if a cubic foot weigh 10.125 lb.?

LESSON XXXI.

1. Find the cost in francs of a bill of exchange on Geneva, Switzerland, that cost $650 in gold, exchange at 5.17.
2. A Chicago merchant gave $24744 currency for a bill on Lyons, France, at 5.15½. What was the face of the bill?
3. What is the cost of a bill of exchange from New York to Hamburg for 27100 marks, exchange selling at 94¼ and gold at 109½, brokerage ⅛% ?
4. What principal will, in 217 days at 6%, amount to $3668.03?
5. Find the marking price at 20% advance of the following bill of goods, and the amount when sold at a reduction of 15%.

7 yds.	Broadcloth,	@	$3.70
50 "	Satinet,		1.10
34 "	Cassimere,	"	2.20
40 "	Flannel,	"	.75
75 Gross	Buttons,	"	1.00

EQUATION OF PAYMENTS.

PRINCIPLES.

1. The payment of a sum of money before it is due is offset by keeping an equal sum of money an equal time after it is due.

2. The use of any sum of money is measured by its interest for the time.

When partial payments are made on a debt before it is due:

RULE.

Multiply each payment by the time it was paid before it was *due, and divide* the sum of the products by the balance unpaid.

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LESSON XXXII.

How long may 1 dollar be kept to balance the use of $6 for 3 months?

How long may 2 dollars be kept to balance the use of $8 for 1 month?

How long may 7 dollars be kept to balance the use of $4 for 21 months?

How long may 15 dollars be kept to balance the use of $9 for 5 months?

If I pay $60 four months before it is due, how long after it is due may I keep $80 to balance it?

If I owe $40 due in 4 months, and $80 due in 6 months, at what time can I cancel both at one payment?

A man owes a grocer $180, of which $90 is to be paid in 4 months, $60 in 7 months, and the remaining $30 in 8 months. When may these debts be discharged by a single payment, so that neither customer nor grocer will sustain a loss?

A man owes as follows: $300 in 5 months, $375 in 4 months, and $900 in 8 months. When may the whole be paid?

LESSON XXXIII.

H. C. Downs & Co. sold a bill of goods payable as follows: $600 in 2 months, $700 in 4 months, and $1000 in 9 months. What was the average term of credit?

Thompson & Taylor sold a bill of goods on the following terms: $600 in 1 month, $600 in 2 months, and $800 in 4 months. What was the average term of credit?

A merchant bought goods on time as follows: $3000 on 3 months, $1200 on 4 months, and $1800 on 5 months. What is the average time of payment?

A contractor owes as follows: $350 in 20 days, $300 in 45 days, and $400 in 60 days. How many days before the whole should be paid?

A dealer in stock bought 100 horses and 120 mules, giving $120 per head for the horses, and $100 per head for the mules. He agreed to pay $\frac{1}{3}$ of the money in 4 months, $\frac{2}{3}$ in 6 months, and the balance in 8 months. How long credit should he have on the whole sum if he pay it at one time?

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LESSON XXXIV.

1. May 1. I owe Mr. A. $8, due in 5 mo.; $10, due in 2 mo.; and $12 due in 10 mo. At what date may I pay the whole?
2. On April 20 a merchant bought as follows: $700 on 20 days, $800 on 30 days, and $600 on 40 days. Find the average term of credit, and the equated time of payment.
3. On August 1 a man gave notes as follows: $250 due in 4 mo., $650 due in 2 mo., and $800 due in 7 mo. At what time may they all be paid in one sum?
4. Jan. 1. I am owing Henry Smith the following amounts: $500 due in 4 mo., $750 due in 8 mo., and $900 due in 12 mo. At what date may I settle by giving my note on interest for the whole?
5. The interest is $6.53 for 1 year 3 months, at 6%. What is the principal?

LESSON XXXV.

1. On Sept. 15, a merchant gave notes as follows: $200 due in 3 mo., $150 due in 2 mo., and $400 due in 4 mo. What was the average term of credit, and what the equated time of payment?
2. May 1, a lady agreed to pay for furniture as follows: $100 in 1 month, $200 in 2 months, $300 in 3 months, and $400 in 4 months. At what time may they all be in one sum without loss to either party?
3. If I lend $60 for 2 months, for how long a time should I have the use of $25 to balance the favor?
4. On May 2, a merchant gave notes as follows: $300 due in 10 days, $200 due in 25 days, and $500 due in 26 days. What was the average term of credit, and what the equated time of payment?
5. Having $5238 to invest, I find I can purchase Chicago City 6's at 107½%, and New York 5's at 96½%, brokerage ⅛% in each instance. How much more will I receive yearly by investing in the former than in the latter?

LESSON XXXVI.

1. A borrows of B $500 for 4 months. What sum should A lend B for 5 months to discharge the obligation?
2. *C. H. Tyler* sold to W. A. Colt a bill of goods amounting to *$3600,* payable as follows: ⅓ in 30 days, ⅜ of the remainder

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in 60 days, and the remainder in 3 months. What was the average term of credit?

3. At what rate per cent must $6912 be loaned for 2 years 7 months and 24 days to gain $1007.424?
4. What is paid for $7610.80 sight exchange on New York, at $\frac{1}{2}\%$ premium?
5. How many shares of railroad stock, at 5% advance, can be purchased for $12600?

LESSON XXXVII.

1. A owed B $2500 to be paid in 12 months; but in 2 months he paid $400, in 4 months $600, and in 6 months $\frac{1}{3}$ of the remainder. When in equity ought the balance to be paid?
2. H. Giles owes Bond & Co. $2400 to be paid in 12 months; but in 6 months he made a payment sufficiently large to extend the time for the payment of the balance 12 months. How large a payment did he make?
3. What principal at 6% will in 9 months give an interest of $3915?
4. When Missouri 6's are 5% below par, what sum must be invested in this stock to obtain an income of $1800?
5. $(4-.00036+.316)-(.75+.004)\times(3\frac{1}{2}\times\frac{4}{7})=?$

LESSON XXXVIII.

WHEN THE TERMS OF CREDIT BEGIN AT DIFFERENT DATES.

1. What is the average time at which the following bills become due: Mch. 1, 1880, $200 on 1 mo. credit; Apr. 12, 1880, $500 on 3 mo. credit; May 14, 1880, $200 on 2 mo. credit; and June 1, 1880, $400 on 4 mo. credit?
2. A man bought merchandise as follows: Jan. 15, 1880, on 4 mo. $750; Feb. 3, on 60 da. $1100; Mch. 25, on 4 mo. $2200; Apr. 2, on 30 da. $500. Find the equated time.
3. A man lost 40% by selling an article for $120. For what should he have sold it to have gained 25%?
4. A cellar 22 feet square and 7 feet high was filled with water. After one-half the water disappeared by drainage, how many gallons remained in the cellar?
5. $14\frac{2}{7}\%$ of $37\frac{1}{2}\%$ of $3\frac{1}{3}$ times 268.8 is $16\frac{2}{3}\%$ of 48 times what number?

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LESSON XXXIX.

1. James Dayton, of Dubuque, Iowa, bought of Jackson & Co. the following bills of goods on 4 mo. credit: Apr. 1, 1881, $650; May 10, $500; June 12, $800; June 30, $1000; July 4, $600. Find the equated time of payment.
2. I have 3 notes as follows: the first for $640, due January 1, 1882; the second for $850, due Apr. 20, 1882; and the third for $1200, due June 4, 1882. At what date should a single note be made payable, to be given in exchange for the three notes?
3. A merchant sold hardware to the amount of $2784.50, and received a note at 90 days without interest; after holding it 30 days he had it discounted at bank at 8%. How much did he realize from the sale?
4. How many perches of stone will build a wall 120 ft. long, 16½ ft. high, and 1½ ft. thick, no allowance being made for mortar?
5. I invest $35100 in business that pays me $526.50 a month. What annual rate of interest do I receive?

LESSON XL.

1. What is the equated time of maturity of notes for merchandise bought as follows:

   May 9, 1880, $ 170 on 4 mo. credit.
   June 6, " $1060 on 4 mo. "
   July 8, " $ 213 on 3 mo. "
   Aug. 30, " $ 300 on 4 mo. "

2. What is the equated time of maturity of notes for merchandise bought as follows:

   Mch. 3, 1883, $500 on 3 mo. credit.
   Apr. 15, " $ 90 on 4 mo. "
   June 20, " $650 on 3 mo. "
   Aug. 10, " $160 on 3 mo. "

3. What is the rate of income upon money invested in Chicago 4's at 105%?

   What is the rate of income upon money invested in Maryland 5's at 88%?

4. A pile of wood contains 200 cords; it is 8 ft. wide and 8 ft. high. How long is the pile?
5. In a certain town it becomes necessary to levy a tax of $8379, *and to pay 5%* for collection; the taxable property is valued at $1749000, and the town contains 150 polls, to be

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assessed 50 cents each. What is the tax on one dollar, and what is A's tax, whose property is valued at $1000 and who pays for one poll?

LESSON XLI.

AVERAGE OF ACCOUNTS.

DR. G. C. DOYLE. CR.

1880.			1880.		
April 5,	To merchandise,	$100.00	April 15,	By Cash,	$ 50.00
May 8,	" " 2 mo.	280.00	May 10,	" "	200.00
May 20,	" " 1 mo.	800.00	May 30,	" "	200.00

What should be the date of a note given to settle the above account?

2. At what rate per cent must $1768 be put at interest for 3 yr. 6 mo. to yield an interest of $371.28?
3. A man who has failed in business owes me $500; his assets are $10000 and I receive $200. What are his liabilities?
4. Add $\frac{1}{4}$ of a year of 365¼ days, and $\frac{2}{3}$ of a week.
5. A man sold his farm for $9600 and thereby cleared $\frac{1}{8}$ of the amount. What would have been his gain per cent if he had sold it for $10206?

LESSON XLII.

1. What is the equated time for the payment of the balance of the following account?

DR. IRVING HOWARD. CR.

1882.			1882.		
June 6,	To merchandise,	$6000.00	June 2,	By merchandise,	$5450.50
" 23,	" "	2542.50	" 19,	" "	2642.25
" 30,	" note,	3622.75	July 10,	" "	1462.50
July 12,	" cash,	2480.15	" 16,	" "	840.00

2. A man gained $\frac{1}{3}$ of 12% on a quarter of a million dollars. If that is 33⅓% of his income, what is his income?
3. How many quarts of water will a vessel contain that is an exact measure for 64 quarts of grain?
4. At $1.37½ a gallon what will be the cost of 8 casks of wine, *each containing* 30 gal. 3 qt. 1 pt.?

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5. A merchant received a note for $2500, to run nine months from Oct. 1, without interest. Having a bank indebtedness of $1850 to meet Dec. 1, he turned in the note at a discount of 8%. How much should he receive back from the bank?

LESSON XLIII.

1. Find the equated time and the cash balance of the following:

DR. MANLY IRVING. CR.

1882.			1882.		
Mch. 15,	To merchandise at 3 mo.	$1200	May 10,	By cash,	$ 600
April 3,	" " " 4 mo.	1400	July 1,	" "	800
May 10,	" " " 6 mo.	2000	Aug. 15,	" "	1000

2. A tobacconist bought 2 T. 10 cwt. 70 lb. of tobacco at 20 cents a pound, and 1825 lb. of hay at $8.50 per ton. What was the amount of his bill?
3. How much will it cost to dig a cellar 40 ft. by 30 ft. and 6 ft. deep, at 35 cents per cu. yd.?
4. What sum must be invested in New York 6% bonds, purchasable at 90%, to obtain an income of $840?
5. A man's yearly expenses are $1200; 75% of his expenses is just 33⅓% of ⅓ his income. What is his income?

LESSON XLIV.

1. What is the equated date of maturity of each side of the following account?

DR. MARSON FRENCH *in Account with* PAUL JONES. CR.

1880.			1882.		
Apr. 4,	To merchandise at 3 mo.	$440	July 1,	By cash,	$200
June 1,	" " " 4 mo.	240	Oct. 3,	" "	75
July 15,	" " " 4 mo.	400	Dec. 20,	" "	275

2. Reduce $\frac{11}{33}$ of a rod to the fraction of a league.
3. Reduce to integers of lower denominations $\frac{7}{8}$ of a mile. Reduce .5625 of a cwt. to integers.
4. How many yards of carpeting $\frac{3}{4}$ of a yd. wide will carpet a room 36 ft. long and 27 ft. wide?
5. *How large* a sight draft can be bought for $519.04, exchange *being* 1⅜% premium?

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LESSON XLV.

PARTNERSHIP.

1. Two men are in partnership; A furnishes $600 and B $800; they gain $2800 the first year. What are the profits of each?
2. Three persons bought a section of land: A paid 2400, B $2000, and C $1200; they cleared during the first 5 years $5600. What was each one's profit?
3. Having $20825 to invest, I find I can purchase United States 5's extended at 103⅜%, and United States 5-20's of '91 at 118¼%, brokerage ¼% in each instance. How much more do I receive yearly by investing in the former than in the latter?
4. An estate worth $22854 is divided between A and B so that A receives ⅛ more than B. What does each receive?
5. A man left $\frac{5}{11}$ of his property to his wife, ½ of the remainder to his son, and the remainder, which was $30000, to his daughter. What was the value of the estate and what was the share of each?

LESSON XLVI.

1. A fisherman and six assistants secured $20000 worth of bone and oil during a 6 months' voyage. The leader had 4 shares and each assistant one. What did each receive?
2. Four persons engage in manufacturing, and invest jointly $36600; at the expiration of a certain time A's share of the gain is $2000, B's $2800, C's $8430, and D's $5070. How much capital did each invest?
3. I sold an article to a man for ⅛ more than it cost me; he sold it for $12, which was ⅛ less than it cost him. What did it cost me?
4. What sum of money will produce $71.40 in 2 years 6 months at 8%?
5. What is the rate per cent when the interest of $1250 for 2 years is $150?

LESSON XLVII.

1. A and B were partners in business; A put in $9000 and B $11000; their profits in 4 years were $24000. What was the annual share of each?

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2. A, B, and C engaged in business; A furnishes $80000, B $120000, and C $150000; their gain in one year was $31500. What was each partner's share?
3. How many yards of silk $\frac{3}{8}$ of a yard wide, will it take to line $7\frac{1}{2}$ yards of cloth $1\frac{3}{4}$ yards wide?
4. A man owed $2500, due in 1 yr. 3 months; but in 5 months he pays $800, and in 7 months $900. When in equity ought the balance to be paid?
5. When it is noon in Chicago what is the time 20° 40′ west of Chicago?

LESSON XLVIII.

1. Three men engaged in a lumber speculation; A furnished $12000, B as much as A + $4000, and C $\frac{1}{2}$ as much as A and B — $2000; their gain was $34200. What was each man's share of the gain?
2. A, B, and C engaged in buying produce; A furnished $2500, B $3000, and C $\frac{1}{4}$ of the entire capital. If the firm lose $4620 what is each partner's loss?
3. $900. Chicago, Apr. 10, 1882.

Ninety days after date, for value received, I promise to pay Ray Smith, or order, nine hundred dollars, with interest at 6%.

H. E. LORNE.

What is the bank discount at 8%, May 21, 1882?

4. What is the surface of a block 4 feet long, $2\frac{1}{2}$ feet wide, and 2 feet high?
5. A engages in trade and at the end of one year finds he has added to his capital 25%. He then takes a partner, who invests an amount equal to 150% of A's capital. The next year they add 50% to the entire amount invested, when they find they have $36900. How much had A at first?

LESSON XLIX.

1. A, B and C engage in business; B invests $\frac{1}{3}$ as much as A, and C $\frac{1}{4}$ as much as B. If their profits amount to $4608, what will be each partner's share?
2. The capital of two partners is in the proportion of 5 to 6; their profits are $11600 and their expenses $2800. What is each partner's share of the net profits?
3. A man's expenses are 75% of his income, and $33\frac{1}{3}$% of his income equals 20% of his property, which is valued at $11000. What are his expenses?

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4. $\frac{1}{8}$ of a certain number is 16 more than $\frac{1}{5}$ of it. What is the number?
5. What would be the cost of 9 cwt. $12\frac{1}{2}$ lb. of sugar at \$8.50 per hundred weight?

LESSON L.

1. A, B and C furnish capital to engage in business, and D does the work for $\frac{1}{4}$ of the profits. A invests \$10000, B \$7200, and C \$6000; they gain \$7424. What is each one's share of the gain?
2. Three men engage in business; A furnishes \$12000, B $\frac{1}{2}$ as much as A + \$8000, and C as much as A and B — \$10000. If they lose at the rate of \$840 quarterly, what is each one's loss at the end of the year?
3. If a merchant sell $\frac{1}{3}$ of an article for what $\frac{9}{10}$ of it cost, what is his gain per cent?
4. Apr. 20, 1882, Smith and Clark bought lumber to the amount of \$4000, on 4 months credit, but paid \$1000 May 30, \$800 June 2, and \$950 June 21. When ought they to pay the balance?
5. I purchased \$9840 worth of stock at $102\frac{1}{2}\%$, and sold $\frac{1}{3}$ of it at a loss of $4\frac{1}{2}\%$, $\frac{3}{5}$ of the remainder at a loss of $5\frac{1}{4}\%$, and what still remained at a gain of $16\frac{2}{3}\%$. What was the result of the transactions?

LESSON LI.

WHEN THE CAPITAL OF EACH IS EMPLOYED FOR DIFFERENT TIME.

1. A, B and C gained in trade \$6240; A furnished \$12000 for 1 year, B \$10000 for 8 months, and C \$16000 for $5\frac{1}{2}$ months. What was each one's profit?
2. The joint capital of a company was \$99900; A put in $\frac{1}{3}$ for 9 months, B $\frac{2}{5}$ for 6 months, and C the remainder for 1 year; they gain \$639360. What is each one's share of the stock at the end of the year?
3. If I lose $\frac{1}{4}$ of my money and spend $\frac{1}{7}$ of the remainder and then have \$4800, how much had I at first?
4. In what time will \$2500 produce \$300 at 6%?
5. What is the cash value of a bill of goods amounting to \$6430.90 at 20% discount and 5% off for cash?

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LESSON LII.

1. Jan. 1, 1880, three persons began business with $2600 furnished by A; Apr. 1, B put in $2500; Sept. 1, C put in $1800; the profits at the end of the year were $2436. What was the gain of each?
2. A, B and C lost $4250 by speculating in hops; A furnished $2500 for one year, B $4000 for 10 months, and C $5000 for 6 months. What was each one's share of the loss?
3. If $\frac{1}{4}$ of A's money equal $\frac{2}{3}$ of B's, what part of B's equals $\frac{5}{8}$ of A's?
4. What per cent will I make on my money if I invest in United States 4½'s registered, at 110%?
5. 4 times $\frac{3}{17}$ of a number is 12 less than the number. What is the number?

LESSON LIII.

1. A's gain is $900, B's $1125, C's $1600; A's capital is in 6 mo., B's 9 mo., and C's 1 yr. 4 mo. The capital being $13718 how much did each own?
2. A and B form a partnership, each putting in $2000; after 3 months A takes out $800 and B puts in the same amount; A and B do the same thing in 3 months later; at the close of the year their gain is $1600. What should each receive?
3. What was the width of a pile of wood 48 feet long and 8 feet high, that cost $198 at the rate of $5½ per cord?
4. A father left each of two sons $25000; the elder added 20% to his portion each year for 4 years, and the younger lost ¼ as much, in the same time, as the elder brother gained. How much had each at the end of the 4 years?
5. When money is loaned at 10%, and $2418.15 is paid for the use of $6909, how long has it been loaned?

LESSON LIV.

1. A begins business with $12000; after 6 mo. he takes in B with $20000; at the end of the year their gain is $6600. What is each partner's share?
2. A, B, C and D pay $640 for pasture; A puts in 48 cattle, B 40, C 120, D 192. What does each one pay for pasturing his cattle?
3. What is the rate per cent when the interest of $50.80 for 45 *days is* $.762?

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What is the difference between the true and bank discount of $6482 for 90 days at 10%?

What will be the total cost of 440 barrels of flour at $5.75 per bbl., if a purchase commission of 2½% is paid, and ½% for draft to cover the cost and commission, and $15.60 for freight?

LESSON LV.

A furnished a cheese factory 140 quarts of milk each day for 50 days, B 160 quarts each day for 80 days, and C 100 quarts each day for 90 days; they all received $1008. What was paid per quart, and what was the amount received by each?

A, B and C contracted to build a court house; A furnished 30 men for 4 mo., B 18 for 6 mo., and C 25 for 10 mo.; their net profits were $9560. What was the share of each?

A broker bought 50 shares of stock at 8½% premium, and sold them at 1¼% discount. How much did he lose?

A wine merchant received $219.52 for wine, which he sold at the rate of 8 cents a gill. What was the quantity sold?

What amount will be received on a note of $1000, due at bank in 90 days, at 7%?

LESSON LVI.

A, B and C engaged in business; A put in $5000 for 6 mo., B $4000 for 10 mo., and C $6000 for 11 mo. If they gain $3264, what is each partner's share of the gain?

A, B and C lost $34574.40 in speculating in silver mine stock; A furnished $20000 which was employed for one year, B $18000 for 10 months, and C 21000 for 8 months. What was each one's share of the loss?

What is the bank discount of a note for $1200, due in 90 days, at 8%?

I bought 60 hogsheads of molasses for $1200; paid in duties $41.32, for freight $81.56, for cartage $12.10, and for insurance $61.68. If I sell the molasses at $52 per hogshead, how much shall I gain per cent?

How many shingles, each covering a space 4 in. one way and 6 inches the other, would it take to cover a roof 36 feet long and 27 feet wide?

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LESSON LVII.

ANALYSIS.

1. Three gentlemen built a factory for $34983, and the money furnished was in the proportions of 6, 8 and 9. What was the amount furnished by each?
2. If I send a friend $450 for 8 months, how long ought he to lend me $600 to requite the favor?
3. If a 7 cent loaf of bread weigh 9 ounces, when flour is $8 per barrel, how much ought it to weigh when flour is $6 per barrel?
4. When the days are 14 hours long, and it is sunrise at one meridian, what time is it at a point 6° 20′ west?
5. Mr. A sold a farm for $\frac{5}{8}$ of $87\frac{1}{2}\%$ of 210% of what he paid for it. What was his gain or loss per cent?

LESSON LVIII.

1. A's capital is 25% more than B's, and 20% less than C's. If their profits are $5612, what is the share of each?
2. One man can do a certain piece of work in 12 days, and another man can do it in 16 days; in what time can the two do the work working together?
3. If 28 men can do a piece of work in 20 days, by working 10 hours a day, in how many days can 36 men, by working 9 hours a day, do the same work?
4. A gentleman engaged three wood cutters; the first worked 10 days of 10 hours each, the second 14 days of 9 hours each, and the third 16 days of 8 hours each; their joint wages amounted to $70.80. What share of the wages ought each to receive?
5. What is the least amount of money with which you could buy an exact number of bushels of wheat at $\$1.37\frac{1}{2}$ per bushel, or oats at $62\frac{1}{2}$ cents, or corn at 50 cents, or rye at $87\frac{1}{2}$ cents per bushel?

LESSON LIX.

1. If $\frac{2}{11}$ of a pole stand in the mud, 3 ft. in the water, and $\frac{11}{2}$ above the water, what is the length of the pole?
2. If 6 acres of land cost $\frac{7}{48}$ of $\frac{24}{25}$ of $168, what will $\frac{3}{16}$ of $\frac{28}{45}$ of *15¼ acres cost?*
3. *What will* be the cost of 3 garments, each requiring $3\frac{1}{4}$

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yards, $1\frac{3}{4}$ yards wide, at $\$3\frac{1}{2}$ per yd., and lining $\frac{3}{4}$ yd. wide at $\$1\frac{1}{4}$ per yd., and $\frac{1}{8}$ the price of the material being paid for making?

$\frac{8}{17}$ of 1768 is $\frac{1}{2}\frac{2}{3}$ of what number?

After traveling some distance, a gentleman ascertained that his watch, which kept correct time, was 1 hour and 20 min. fast. Which way had he traveled and how far?

LESSON LX.

A gentleman divided $\$115700$ among two sons and a daughter, in the proportions of $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$. What sum did each receive?

A gentleman being asked the price of his horse, replied: "If you multiply the price by 24, and divide $\frac{4}{5}$ of the product by 8, the quotient will be 375." What was the value of the horse?

A man owning $\frac{3}{4}$ of a vessel sold $33\frac{1}{3}\%$ of his share for $\$6840$. What was the value of the ship?

Write a note from the following: Face $\$2500$; date Jan. 6, 1881; negotiable; maker, W. C. Stevens; payee, S. M. Crumtis; payable on demand; rate of interest 6%. What will be the amount due one year after date?

A broker bought stock at $97\frac{1}{2}\%$ and sold it at $106\frac{1}{4}\%$, thereby gaining $\$3420$. How many shares did he purchase?

LESSON LXI.

A man spent $\frac{2}{3}$ of his money, and then $\frac{2}{5}$ as much as he had already spent, and had remaining $\$4800$ less than he had at first. How much had he at first?

A earns $\$45.75$ as often as B earns $\$36.50$; they together earn $\$740.25$. How much did each earn?

If a miller take $\frac{1}{8}$ for grinding grain, how much grain must a farmer supply to receive 120 bushels?

From a piece of silk containing $129\frac{3}{4}$ yards, $13\frac{3}{4}$, $20\frac{5}{8}$, and $22\frac{4}{5}$ yards were cut, and the remainder was divided into five pieces of equal length. What was the length of each piece?

If a locomotive can run a quarter of a mile in 15 seconds, how far, at the same rate, could it run in 2 da. 19 hr. 43 min. 30 sec.?

LESSON LXII.

If $\$525$ yield $\$75.60$ interest, what principal will yield $\$624.96$?

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2. If 8 men can cut 60 cords of wood in 3 days, in how many days can 9 men cut 135 cords?

3. A ship's crew of 90 men, with each an allowance of 40 oz. of biscuit per day, lost 10 men and was ice-bound, which lengthened the voyage $\frac{1}{8}$ of the time allowed for it. What was the final daily allowance of each?

4. A, B and C hired a horse and carriage, each agreeing to pay in proportion to the number of days he used them; to every day that A used them, B used them $1\frac{1}{2}$ days and C $1\frac{1}{3}$ days; they paid $103.50. The rate per day being $1\frac{1}{2}$, how many days did each man use them?

5. $1240.50. Memphis, Tenn., Oct. 14, 1880.

Two years after date, for value received, I promise to pay H. C. Childs, or order, one thousand two hundred forty $\frac{50}{100}$ dollars with interest at 8%.

M. O. GRUNDY.

On this note were the following indorsements: June 20, 1881, $65; Oct. 10, 1881, $150; Jan. 30, 1882, $640; May 9, 1882, $100. How much remained due Oct. 14, 1882?

LESSON LXIII.

1. The cost of a man's house, lot and farm are to each other as $\frac{1}{3}$, $\frac{1}{8}$ and $\frac{1}{9}$; the entire cost was $1508. What was the cost of each?

2. If $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{7}$ and $\frac{1}{8}$ of a certain number are added to it, $\frac{1}{2}$ of the sum will equal 936. What is the number?

3. When I. C. R. stock is quoted at 1.10\frac{1}{4}$, how much stock can be bought for $99450, brokerage $\frac{1}{4}$%?

4. What number diminished by 75% of 40% of itself equals $\frac{1}{4}$ of 40% of 14700?

5. A merchant bought 40 packages of cards, each containing 2 great gross, $\frac{1}{2}$ gross, $9\frac{1}{2}$ dozen and 5 score and 20. How many cards were there in all?

LESSON LXIV.

1. The fore-wheels of a carriage are 10 ft. 6 in. in circumference, and the hind-wheels are 14 ft. in circumference. How many more revolutions will the fore-wheels make than the hind-wheels in going $\frac{1}{2}$ mile?

2. If it cost $120 to dig a cellar 30 ft. long, 25 ft. wide and 6 *feet deep*, how much will it cost to dig a cellar 40 feet *long*, 32 feet wide and 5 ft. deep?

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In a speculation A put in $4000 for 3 months, then added $2000 and continued the whole 3 months longer; B put in $8000 and after 4 months took out $\frac{1}{4}$ of his stock, and continued the remainder 2 months longer; C put in $15000 for 2 months, then took out $\frac{1}{3}$ of his stock and continued the remainder 4 months longer; they gained $8648.80. What was the share of each?

Sold cloth at $1.12 per yard, thereby gaining $16\frac{2}{3}\%$. What did it cost per yard?

What sum of money will produce $252.35 interest in 1 month 12 days at 7%?

LESSON LXV.

A man owns 2 lots and wishes to erect upon one of them a store that will cost $12000; If he puts it upon the first lot their united values will be $1\frac{1}{5}$ times that of the second lot, and if he puts it upon the second lot, they will be worth $6\frac{1}{2}$ times as much as the first lot. What is the value of each lot?

A and B were partners; $\frac{4}{7}$ of A's capital equaled $\frac{3}{5}$ of B's; A's capital was in 10 months and B's 12 months. If their losses were $1984.50, what was the share of each?

A man purchased a lot for $4800 and put a house upon it that cost $37\frac{1}{2}\%$ more than $\frac{2}{5}$ of the price of the lot. What was the cost of the house and lot?

What is the cash value of a bill of goods amounting to $4780, at 15% discount and 6% off for cash?

The proceeds of a note for $14350, discounted at bank for 10 months at 6%, were invested in wheat at $1.40 per bushel, after deducting $2\frac{1}{2}\%$ commission. How many bushels were bought?

LESSON LXVI.

A piece of flannel containing 148 yards was cut into 3 pieces; $\frac{2}{5}$ of the number of yards in the first piece was equal to $\frac{1}{3}$ of the number of yards in the second piece, and to $\frac{1}{2}\frac{5}{7}$ of the number of yards in the third piece. How many yards were there in each piece?

How much more time will be required to walk 46 rods, when the steps are 1 ft. 11 in. in length than when the steps are 3 ft. in length, allowing 2 seconds to a step?

A and B enter into a partnership for 3 years; A put in $7000

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and B put in $9000. At the end of 18 months A took out $3000 and B put in $2000; at the end of the third year they divided $13650 as net profits. What was the share of each?

4. A stock company made an assessment of 8% to repair damages by water. How much must a stockholder pay who owns 40 shares of $50 each?

5. 25% of 560 is 33⅓% more than what number?

LESSON LXVII.

1. A man who owes me $2400 fails in business. If his liabilities are $161040 and his assets are $26840, how much shall I receive?

2. What are a man's liabilities if his assets are $6675, and on a debt of $2680 he pays $1005?

3. How many square yards in a board fence that is 5 feet high, and that surrounds a lot 36 rods 4 yards 2½ feet long, and 20 rods 9½ feet wide?

4. A, B and C engage in business; A furnished 25% of the capital, B 35% and C the remainder. A's capital was employed 14 months, B's 12 months, and C's 10 months; they lost $1123.20. What was each partner's share of the loss?

5. A merchant wishes to raise $10500 on an indorsed note, payable in 45 days, and discounted at bank at 7%. For what sum must the note be written?

LESSON LXVIII.

1. A reservoir has 3 supply pipes; the first will fill it in 16 days, the second in 20 days, and the third in 24 days. In what time will it be filled if all are left open?

2. A man spent $310 more than $\frac{1}{12}$ his income for household expenses, $\frac{1}{3}$ of what he had left and $140 more for rent, $100 more than $\frac{2}{3}$ of what then remained for clothing, and then had $125 left. What was his income?

3. How much must cloth, costing $3.60 a yd., be marked, that I may deduct 10% from the marked price and still make 20% profit?

4. A gentleman invested $\frac{1}{4}$ of his yearly income in mortgages paying 10% annual interest; in 6 mo. 20 da. the interest amounted to $83.33⅓. What was his annual income?

5. *A merchant* sold a stock of goods for $21622, which was *113¾% of their* cost. What was their cost?

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LESSON LXIX.

ALLIGATION MEDIAL.

1. A grocer mixed 12 pounds of tea worth $1 per pound with 5 pounds worth $1.50 per pound, and 3 pounds worth 80 cents per pound. What is one pound of the mixture worth?
2. A grocer mixed 20 pounds of tea worth $1 per pound with 36 pounds at $1.08 per pound, and 40 pounds at 80 cents per pound. What is the mixture worth per pound?
3. What per cent on his money will a man receive annually if he invest in United States 6's at 107½%, brokerage ¼%?
4. Find the average term of credit of $1200 due in 2 months, $800 due in 5 months, and $1000 due in 6 months.
5. Reduce 14 hr. 20 min. 50.4 sec. to the decimal of a day.

LESSON LXX.

1. A grocer mixed 100 lb. of sugar, worth 8 ct. per lb., with 120 lb. at 9 cents, and 100 lb. at 10 cents. What is a pound of the mixture worth?
2. A merchant put 12 gallons of water into a cask containing 40 gallons of rum worth 65 ct. per gallon. What is a gallon of the mixture worth?
3. What decimal of a pound Troy is 10 oz. 13 pwt. 9 gr.?
4. What will be the cost of 658 lb. of hay at $9.50 per ton, and 5280 feet of boards at $14.75 per M?
5. A tax of $1834 is to be assessed on a town in which there are 320 polls assessed at 80 cents each; the property is valued at $105200. What is the tax on a dollar, and what is a man's tax whose property is valued at $2400 and who pays for 1 poll?

LESSON LXXI.

1. If 50 pounds of sugar at 12 cents a pound, and 100 pounds at 9 ct. a pound be mixed with 150 pounds worth 8 cents a pound, what will a pound of the mixture be worth?
2. If coffee at 18, 22, 30, 35 and 40 cents per pound be mixed, what will be the value of one pound of the mixture?
3. A, B and C put in trade $427.20; A's capital was in 6 mo., B's 8 months, and C's 10 months. They gained $3600, which was so divided that A received $5 as often as B received $6, and as often as C received $4. What amount did each invest?

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4. A ship sailed 1804 mi. 3 fur. 12 rd. in 11 days. What was the average distance sailed per day?
5. Find the amount of $9369.36 for 11 days at 12½%.

LESSON LXXII.

1. A druggist diluted with 3 gallons of water 6 gallons of alcohol worth 65 cents a gallon, and 4 gallons worth 91 cents a gallon. What was 1 gallon of the mixture worth?
2. For 1 month the thermometer averaged as follows: for the first week 76°, for the second 72°, for the third 78°, and for the fourth 82°. What was the monthly average?
3. A engaged in business with a capital of $4500. After 2 months he took B as a partner, who furnished 1⅓ as much capital as A, and in 5 months later C joined them with a capital of $7600; at the end of 18 months they had gained $7530. What was each partner's share of the gain?
4. What will be the amount of $600 loaned for 3½ yr. at 8%, to be compounded semi-annually?
5. The proceeds of a note for $12000, discounted at bank for 6 months at 6%, were invested in wheat at $1.35 per bushel, after deducting 2½% commission. How many bushels were bought?

LESSON LXXIII.

ALLIGATION ALTERNATE.

1. What proportions of coffees worth 20 cents, 22 cents, and 28 cents per pound must be taken to form a mixture worth 24 cents per pound?
2. What relative quantities of whisky 160, 168, 174, 188 and 192% strong, must be used to form a mixture 180% strong?
3. How many cord feet in a load of wood 13 feet long, 4 feet wide and 10 feet high?
4. To ⅝ of a mile add $47\frac{5}{11}$ rods.
5. What principal, at 7%, will amount to $844.80 in 9 months and 18 days?

LESSON LXXIV.

1. What amount of cranberries, worth $11, $12, and $15½ per barrel, must be sold to realize an average price of $12½?
2. A merchant has wines worth $3, $3½, and $4 per gallon. How much water must be used to form a mixture worth $2½ per gallon?
3. A man being asked how much money he had, replied, "If I

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had ¼ as much as I now have, and $6½ more I should have $400." How much had he?

4. If 12 fields of equal size contain 213 A. 3 sq. ch. 2 sq. rd. 346 sq. l., how much land is there in each?
5. Reduce 15 gallons 3 qt. 3.2 gi. to the decimal of a hogshead?

LESSON LXXV.

WHEN THE QUANTITY OF ONE OF THE SIMPLES IS LIMITED.

1. How many bushels of rye worth 75 cents a bushel, and oats worth 50 cents a bushel, must be mixed with 45 bushels of corn, worth 80 cents a bushel, to make a mixture worth 65 cents a bushel?
2. A grocer mixed 12 pounds of tea worth 80 cents a pound, with teas worth 65 cents, 70 cents, 90 cents, and $1 a pound, and the mixture was worth 75 cents a pound. How much did he take of each kind?
3. In what time will $8 triple itself at 5%?
4. A man gave ⅔ of his estate to his eldest son, ¼ of the remainder to the younger, and divided the remaining portion equally among 4 charitable institutions. What per cent of the whole did each institution receive?
5. How much sugar, at 10 cents a pound, can be obtained for 25 lb. 7 oz. of butter, at 37½ ct. a pound?

LESSON LXXVI.

1. A merchant has red clover, worth 60 cents, white clover worth 90 cents, and timothy worth $1.68 per bushel. He desires to form a mixture worth 120 cents a bushel, and which shall contain 80 bushels of white clover. How much must he take of each kind?
2. How many acres of land, worth $140 an acre, must be added to a farm of 75 acres, worth $200 an acre, that the average value may be $160 per acre?
3. By selling cloth at 15 cents a yard I gained 25% on the cost. What was the cost?
4. An Alton merchant ships flour to New York, and receives in payment a draft on New York for $2480. New York exchange being at ¼% premium in Alton, what amount will be realized from the sale, transportation being $110?
5. The stone foundation of a house 42 feet long, 25 feet wide, and which is 2 feet above ground, is 1½ feet thick and extends 4 feet below the surface. What did it cost at $1.65 *a perch?*

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LESSON LXXVII.

When the Quantity of the Whole Compound is Limited.

1. A grocer has oils at 15 cents, 20 cents, and 25 cents per gallon, and he wishes to make a mixture of 80 gallons worth 18 cents a gallon. How many gallons of each kind must he take?
2. A merchant has wines at 8s., 10s., 14s. and 18s. per gallon; he wishes to make a mixture of 140 gallons that he can sell at 12s. a gallon. What quantity of each must he take?
3. What is the sum of $\frac{1}{17}$ of a lb., $\frac{1}{17}$ of an oz., and $\frac{1}{17}$ of a dr.?
4. The premium paid for insuring a house for $\frac{4}{5}$ its value, at $\frac{1}{8}$ of 1%, was \$120. What was the value of the house?
5. A merchant sold a bill of goods amounting to \$24000 on the following terms: \$6000 to be paid in 2 months, \$6000 in 3 months, and the remainder in 4 months. What was the average term of credit?

LESSON LXXVIII

1. A merchant sold 120 yd. of silk for \$240; the prices were \$1.50, \$1.75, \$2.25, and \$2.50 per yd. How many yards of each grade did he sell?
2. A man paid 4 workmen \$360 for 180 days' labor; he paid them at the rate of \$3, \$2.50, \$1.75, and \$1.50 per day. How many days did each labor?
3. A boy purchased at one time 10 lemons and 8 oranges for 35 cents, and at another time 9 lemons and 15 oranges for 51 cents. The prices being the same how much were the lemons and oranges apiece?
4. A borrowed \$500 of B for 3 months; afterward A loaned B \$25 to be used long enough to repay the favor. How long did B have the use of the money?
5. A gentleman traveling found, on arriving at his destination, that his watch, which kept correct time, was 2 hr. 25 min. fast. In what direction had he traveled, and how far?

LESSON LXXIX.

Square Root.

1. *Find the* square roots of 196; 361; 6889 and 15129.
2. *Find the* square roots of $\frac{49}{100}$; $\frac{225}{1024}$; $\frac{1225}{6561}$ and $\frac{2}{49}$.

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3. If I sell $20000 Chicago City 6's of 1897 at 105%, invest enough of the proceeds in United States 4's, coupon, at 120% to yield an annual income of $600, and buy a lot with the remainder, how much will the lot cost me?
4. If $640 will pay the board of 8 persons for 8 weeks, for how many weeks will $800 pay the board of 15 persons?
5. What decimal of a pound Troy is 10 oz. 13 pwt. 8 gr.?

LESSON LXXX.

1. Find the square roots of $\frac{3}{11}\frac{3}{11}$; .2209; .1444 and 4028.4409.
2. Find the square roots of 720801 and 498436.
3. A tax of 8247.16\frac{1}{4}$, and cost of collection at 2$\frac{1}{4}$%, is to be raised on a certain town. There are 760 polls assessed $1.25 each; the personal property is valued at $211733, and the real estate at $1285667. What is the tax on a dollar, and what is A's tax, whose real estate is valued at $4000, personal property $2000, and who pays for 2 polls?
4. What is the value, in lower denominations, of $\frac{5}{8}$ of a ton?
5. A farmer has hogs worth $8, $10, $12 and $16 per head. What number must he sell of each grade to realize an average price of $11 per head?

LESSON LXXXI.

1. Extract the square root of 30206016.
   Extract the square root of 615188809.
2. What is the measure of the sides of a square lot containing 4900 square rods?
3. A grocer has molasses worth 36 cents, 40 cents, and 50 cents a gallon. How many gallons of each grade must be taken to make a mixture worth 45 cents a gallon?
4. What is the bank discount of $472, at 6%, due in 1 year and 6 months?
5. A man bought two city lots for $5000; the cost of the first was to the cost of the second as 2 to 3; he sold them at a gain of 10% on the first and 7% on the second. What was his entire gain?

LESSON LXXXII.

1. Find the square root of 4096128001. Of 404935129.
2. A lot containing 392 square rods is twice as long as it is wide; what is its length?
3. *If the interest of* $3000 for 1 year and 6 months is $270,

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what amount must be invested for 8 months at the same rate, to give an interest of $550?

4. A man owning 183 A. 3 R. of land, divided ¼ of it into 12 equal lots, each 40 feet long. What was their width?

5. A man dying left property to be divided among his four sons according to the years of their several ages, who were then 11, 14, 16 and 19 years of age. If the property was valued at $75500, and brought 6% interest, what was the share of each at the time the youngest was 21 years old?

LESSON LXXXIII.

1. The base of a right-angled triangle is 15 feet, and the perpendicular is 20 feet. What is the hypotenuse?

2. The hypotenuse of a right-angled triangle is 50 feet, and the base is 40 feet. What is the perpendicular?

3. A farmer has 24 pigs worth $4 each. How many must he buy at $6 and $10 each that he may sell the whole at an average price of $8, without loss?

4. A and B can build a wall in 8 days; B and C in twelve days; A and C in 16 days. How long will it take them to build the wall working together?

5. What will be the cost of 4280 lb. of hay at $10.50 per ton, and 1640 lb. of beef at 6¼ per hundred?

LESSON LXXXIV.

1. The hypotenuse of a right-angled triangle is 10 feet, and the perpendicular is 6 feet? What is the base?

2. What distance will a man travel in walking diagonally across a field which is 60 rods long and 45 rods wide?

3. Reduce 4 fur. 13 rd. 13 ft. 3 in. to the decimal of a mile.

4. A note of $350 was given Dec. 6, 1878, on which was indorsed one year's interest. What was due Jan. 1, 1883, interest at 7%?

5. What is the compound interest of $3420 for 5 years at 7%?

LESSON LXXXV.

1. Find the square root of 2925836281. Of 4106246400.

2. A square field contains 3486784401 square inches. What is the length of each side?

3. Reduce 20 mi. 6 fur. 2 r. 3 yd. 1.5 feet to the decimal of a *degree* of longitude on the equator?

4. *What is the* compound interest of $4280 for 6 yr. at 7%?

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5. What will it cost, at 30 cents a square yard, to plaster a room 27 feet long, 18 ft. wide, and 9 feet high, allowing for 2 windows and 1 door, each 6 ft. by 2½ ft.? $141.80

LESSON LXXXVI.

1. Find the square root of 29506624. Of 3694573089.

2. A boy standing 96 ft. from the base of a tree, discovered a hawk on a limb 31 ft. from the ground. What distance must a ball travel to reach the bird, the gun resting 3 ft. from the ground? 100.7

3. What will 5 cord feet and 12 cubic feet of wood cost at $3.75 per cord?

4. How many bushels of wheat are raised on 150 acres, averaging 22 bu. 3 pk. 5 qt. to the acre?

5. A man's note of $730.74 was given Dec. 3, 1880. June 7, 1883, he paid $194.32. What was due Sept. 11, 1883, the rate of interest being 5%?

LESSON LXXXVII.

1. The diameter of a certain circle is 20 feet. What is the diameter of another circle, whose area is 3 times that of the first?

2. The center-pole of a circus-tent is 40 feet high. What is the length of a rope that extends from the top to a distance of 24 ft. from its base?

3. I bought a bill of goods amounting to $3000, on 6 months' credit; at the end of two months I paid $600 on account, and two months afterward I paid $800 on account, at the same time giving my note for the balance. For what time was the note drawn?

4. What decimal of a £ is 4s. 9d.?

5. A has $724 more than B, and ⅝ of A's money equals ¾ of B's. How much has each?

LESSON LXXXVIII.

1. The radius of a circle is 4 feet. What is the radius of another circle containing 4 times the area of the first?

2. How many rods apart are the opposite corners of a square farm of 360 acres?

3. Find the average term of credit of $400 cash, $500 due in 3 *mo., $850* due in 7 mo., and $800 due in 10 mo.

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4. For how much must I sell $10000 New York 6% bonds, at 1½% discount?
5. Add ⅞ of a hogshead and ⅝ of a gallon.

LESSON LXXXIX.

1. The circumference of a circle is 48 feet. What is the circumference of another circle the area of which is twice that of the first?
2. A balloon rose 144 rods, and was carried by the wind 192 rods due east. How far was it then from the starting point?
3. If 18 men in 8 days, by working ten hours a day, can build a wall 96 yards long, in how many days of 8 hours each, can 30 men build a wall 72 yards long?
4. A man sold two tracts of land for $7912; ¼ of the value of the larger equaled ⅜ of the value of the smaller. What did he receive for each?
5. A broker invested $6688 in bonds at 104½, and sold them at 108½. How much did he gain?

LESSON XC.

1. How many rods of fence will be required to divide a circular field into 4 equal lots, if the diameter of another field, containing ½ the area of the first, is 20 rods?
2. The area of a rectangle, whose length is 3 times its width, is 6348 sq. ft. What is its length?
3. What will 4 boards cost, each 18 feet long and 9 inches wide, at $25 a thousand?
4. A merchant bought $1600 worth of goods, and at the end of 6 months sold them for $1880. Money being worth 10%, what was his gain per cent?
5. What was the duty, at 15%, on 40 chests of tea, averaging 56 pounds each, and invoiced at $.65 per pound?

LESSON XCI.

1. A rectangular field is 36 rods long and 27 rods wide. What is the length of its diagonal?
2. What is the length of a pole standing 48 feet from a building, the top of which, in falling, struck the building 36 feet from the ground?
3. A earns $23.75 as often as B earns $20.50, and as often as C *earns* $18.75; the amount of their earnings in a certain *time was* $756. What was the portion of each?

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What must be the face of a note given at a bank, payable in 8 months at 10%, the proceeds of which are $746?

What would be the cost at Boston, Mass., of a check on New Orleans, for $5684.40 at ¼ of 1% discount?

LESSON XCII.

From the center of each side of a bridge 48 feet long, an iron bar 10 feet in height is placed, which connects two braces of equal length that extend to the corresponding ends of the bridge. What is the length of the beams?

The diagonal of a rectangular field 800 rods in length, is 1000 rods. What is its width?

⅘ of a number exceeds ⅘ of it by 288. What is the number?

A, B and C are partners in business; B furnishes ¼ more capital than A, and C ⅓ as much as A and B; their profits the first year were $6528. What was each partner's share?

How many rods of fence will inclose a rectangular field containing 20 acres, and which is twice as long as it is wide?

LESSON XCIII.

CUBE ROOT.

Extract the cube root of 611960049.

Extract the cube root of 351895816.

In a pile of wood 144 ft. long, 9 ft. wide, and 3½ ft. high, how many cords?

In which investment is there the more profit, in $8400 yielding $336 semi-annually, or in $15000 yielding $1425 annually?

I sent to my agent merchandise which he sold for $10500; he charged 3½% commission, and 2½% for a guaranty. What were the net proceeds?

LESSON XCIV.

What is the cube root of 166012263936?

What is the cube root of 152585280296 27?

The length of a rope is 100 feet, and it extends from the top of a church spire, 96 ft. in height, to the middle of the street. How wide is the street?

A trader bought goods, April 1, 1883, as follows: $400 on 3

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months, $400 on 4 months, $600 on 6 months. What is the equated time of payment?

5. A merchant lost 40% by selling an article for $480. For how much ought he to have sold it to have gained 40%?

LESSON XCV.

1. What is the cube root of 262156288192001?
2. Find the cube root of $\frac{1}{7}\frac{2}{2}\frac{5}{5}$. Of $\frac{2}{7}\frac{1}{1}\frac{6}{0}\frac{}{7}$.
3. A building 80 feet in height casts a shadow of 60 feet. What is the distance from the top of the building to the end of the shadow?
4. Mr. F. bought goods to the amount of $3600, on the following terms: $\frac{1}{3}$ payable in cash, $\frac{1}{4}$ of the remainder payable in 3 months, and what then remained in 4 months. What is the average term of credit?
5. A merchant in St. Louis wishes to pay $6876 in Boston. Exchange being $1\frac{3}{4}\%$ premium, what must he pay for the check?

LESSON XCVI.

1. What is the measure of a cubical bin of a capacity of 216 bushels?
2. A cubical block of stone contains 2744 cubic feet. What is its edge measure?
3. How long is the side of a square lot containing 40 acres?
4. The inside measure of a cellar wall is 24 feet by 18 feet, its height 8 feet, and its thickness $1\frac{1}{2}$ feet. What did it cost at $\$1\frac{1}{8}$ a perch?
5. How many cubic yards of earth were removed in digging the above cellar, if its depth below the surface of the ground is $6\frac{1}{2}$ feet?

LESSON XCVII.

1. Extract the cube root of 41278242816.
2. A cubical pile of wood contains 4096 cu. ft. What is its edge measure?
3. How much more is gained by investing $80750 in New York Central 7's at 95, than in Illinois Central 6's at 85?
4. A ladder 40 feet in length extends from the top of a wall, 32 feet high, to the opposite side of a walk. What is the distance from the foot of the ladder to the wall?
5. *How many* gallons of water will a cistern hold, that is $7\frac{1}{4}$ feet *long,* $3\frac{2}{3}$ feet wide, and $2\frac{1}{6}$ feet deep?

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LESSON XCVIII.

1. What is the cube root of 224567236068687 ?
2. What is the depth of a cubical bin that will hold a thousand bushels ?
3. How many shingles, 4 in. wide and 6 in. exposed to the weather, are required to cover a gable-roof 92 ft. long, and each side of the roof 40 ft. wide, the first row on each of the eaves being double ?
4. I paid $187 to insure my property for $\frac{1}{2}$ of its value, at $1\frac{1}{8}\%$. What is the value of the property ?
5. A father left $5040 to three children, to be divided so that the second should have $\frac{3}{4}$ as much as the first, and the third $\frac{1}{2}$ as much as the other two. What was the share of each ?

LESSON XCIX.

1. The edge of a cubical box measures $3\frac{1}{2}$ ft. What is the edge measure of one which will contain 8 times as much ?
2. What is the depth of a cubical vat that will hold 128 hogsheads of water ?
3. A premium of $3000 was paid for insuring a building worth $60000 for $\frac{2}{3}$ its value, and its contents for $\frac{1}{4}$ its value. The rate for both being $2\frac{1}{2}\%$, what was the value of the contents ?
4. What principal will amount to $1054.017 in 2 years 8 months 20 days, at 9% ?
5. If a garrison of 2400 men has a daily allowance for 12 days of 24 ounces of bread per man, how many days will it last them if they are reinforced by 800 men, and the allowance is reduced to 18 ounces a day for each man ?

LESSON C.

1. If a globe 8 inches in diameter weigh 13 pounds 8 ounces, what is the diameter of a similar one, weighing 32 pounds?
2. A cubical pile of wood whose edge measure is 16 feet, contains how many cords ?
3. A druggist pays at the rate of $5 a pound av. for 20 pounds of opium, and sells it at the rate of $4 for $\frac{1}{2}$ a pound apothecaries' weight. What are his profits ?
4. A merchant bought at an auction sale a case of goods for $\frac{4}{5}$ their first cost, and sold them at $30\frac{1}{4}\%$ profit, thereby gaining 509.83\frac{1}{2}$. What was their first cost?

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5. In a certain town $5700 is to be raised for building a school-house. If 5% of the amount levied is not collected, and 5% is allowed for collecting, what amount must be levied?

LESSON CI.

Arithmetical Progression.

1. The first term is 8 and the common difference 10. What is the 12th term?
2. The first term is 7 and the common difference 5. What is the 18th term?
3. Find the cube root of $42\frac{7}{8}$. Of $\frac{4096}{3375}$.
4. A man having a $\frac{7}{10}$ interest in a block of buildings, sold $33\frac{1}{3}\%$ of his share for $63350, which was $9\frac{1}{2}\%$ less than their valuation. What is the block worth?
5. To ascertain the height of a tower that cast a shadow of 147 ft. 6 in., I measured the shadow of a house that was 36 ft. 6 in. in height, and found it to be 54 ft. 9 in. long. What was the height of the tower?

LESSON CII.

1. The first term of a descending series is 1200, the common difference 15. What is the 50th term?
2. A boy earned 20 cents one day, and 5 cents additional each day for 20 days. What did he earn the last day?
3. What is the length of a side of a square field, the area of which is equal to the area of a field 378 rods long, and 168 rods wide?
4. If goods are sold at 10% below their retail price, which was 30% above cost, what was the gain per cent?
5. If it require $4\frac{1}{2}$ days of 10 hours each for 6 men to saw a pile of wood 40 ft. long, 20 ft. wide, and 5 ft. high, how many days of 8 hours each will 5 men require to saw 2 piles, each 48 ft. long, 16 ft. wide, and 10 ft high?

LESSON CIII.

1. The first term of an increasing progression is 10, the common difference 3, and the number of terms 25. What is the last term?
2. The last term of an increasing progression is 185, the common difference 7, and the number of terms 20. What is the first term?

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3. In a certain town $520 was paid for teacher's wages, $136 for board, $77.68 for fuel, and $10.32 for repairs; the district drew $120 public money, and the whole number of days' attendance was 2400. What was the rate per day, and how much was A's tax who sent one child 115 days?
4. $.2\frac{3}{25} - .006\frac{3}{125} + 3.85 \times 10 \div 800 = ?$
5. How many square feet in the surface of a cube whose volume is 160279981568 cubic feet?

LESSON CIV.

1. A man has 12 children whose ages are in arithmetical progression; the youngest is 3 years old, and the eldest 36. What is the common difference of their ages?
2. A boy bought 18 marbles, the prices of which were in arithmetical progression, giving 5 cents for the first and 56 cents for the last. What was the common difference?
3. What is the length of the edge of a cubical room that contains 8148509600867 cubic inches?
4. What is the annual rate of interest of $99000, invested in business that pays $594 a month?
5. How many more cubic inches in 379 gallons dry measure than in the same number of gallons liquid measure?

LESSON CV.

1. The extremes are 0 and $7\frac{1}{2}$, and the number of terms 16. What is the common difference?
2. A man planted 11 trees an equal distance apart; the first 3 feet and the last 18 feet from the fence. What was the distance between the trees?
3. What are the present worth and true discount of $1451.80 payable in 7 mo. 12 da., at 6%?
4. What per cent can a man pay whose liabilities are $24000, and whose assets are $9000?
5. A, B and C entered into partnership; A furnished $6000 for 8 mo., B $5000 for 10 mo., and C $5000 for 1 yr.; they gained $3160. What was each one's share of the gain?

LESSON CVI.

1. A man walked a certain distance, increasing it daily by a common difference; the first day he walked $\frac{1}{4}$ of a mile, and the 17th day 50 miles. How many miles did he walk *in all*?

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2. A child learned to count in arithmetical progression; the first day he counted 8 and the 20th day 103. What was his progress each day?
3. A tank $24\frac{3}{4}$ feet long, $12\frac{1}{2}$ feet wide and 6 feet deep, is $\frac{1}{2}$ full of water. How many gallons are there in the tank?
4. What must be the face of a note, payable at bank in 9 mo. 27 da., interest 8%, that the proceeds may be $1791?
5. If a man walk 384 miles in 12 days, walking 8 hours a day, how far can he walk in 20 days, walking 6 hours a day? Solve by proportion.

LESSON CVII.

1. The extremes are 7 and 97, and the common difference is 9. What is the number of terms?
2. The first term is $\frac{1}{3}$, the last term $3\frac{1}{3}$, and the common difference $\frac{1}{3}$. What is the number of terms?
3. How much will it cost, at 16 cents a square foot, to line with zinc a cubical box, of a capacity of $166\frac{3}{8}$ cubic feet?
4. A man bought stock at 15% below par, and sold it at 15% above par. What per cent profit did he make?
5. Divide 8084 into 4 parts, which shall be to each other as $\frac{1}{4}$ of 8, $\frac{2}{5}$ of 36, $\frac{1}{7}$ of 21, and $\frac{7}{11}$ of 33.

LESSON CVIII.

1. A man deposited in a savings bank $1 on the first day of March, $4 the second, $7 the third, and so on until the last deposit was $136. What was the date of the last deposit?
2. A lady commenced copying by writing 1 hr. 20 min. the first day and 6 hr. 50 min. the last day, each day increasing the time 10 minutes. How many days did she write?
3. How many cords of wood in 4 piles, each 4 feet wide, the first being 30 ft. long and 5 ft. high, the second 36 ft. long and 4 ft. high, the third 40 feet long and 5 ft. high, and the fourth 42 ft. long and 5 ft. high?
4. A premium of $455 was paid for insuring a house for $\frac{3}{5}$ its value, at $1\frac{1}{4}$%. What was the value of the house?
5. Three men agree to do a certain piece of work; A and B can do the work in $10\frac{10}{11}$ days, B and C in $11\frac{1}{3}$ days, and A and C in $11\frac{3}{7}$ days. How long will it take the three to *do the work*, if they work together?

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LESSON CIX.

1. A man bought a farm, agreeing to complete the payments in 1 year; the first month he paid $12 and the last month $612. What was the value of the farm?
2. How many times, beginning at 2 o'clock, does a common clock strike in 8 hours?
3. How many square feet in the surface of a cube that has a volume of 166012263936 cubic inches?
4. What is the length of a side of a square field whose surface is 615188809 square feet?
5. A boy can dig a ditch in 15 days, working 10 hours a day; another boy can dig it in 10 days, working 10 hours a day. In how many days of 7 hours each can they together dig the ditch?

LESSON CX.

1. If rain fall $5\frac{1}{2}$ ft. the first second, $8\frac{1}{12}$ ft. the second second, $11\frac{2}{3}$ ft. the third second, and so on, how far will it fall in a minute?
2. How many strokes does a common clock make in 9 hours, commencing at 3 o'clock?
3. A broker received $300 for selling some uncurrent money. Brokerage being $\frac{1}{4}\%$, how much money did he sell?
4. What must be the length of a bin 8 ft. wide and 6 ft. deep, to contain 432 bushels of corn?
5. From 19 cwt. 20 lb. 3 oz. take $\frac{4}{5}$ of a ton and 8 oz.
   Reduce 26 gal. 3 qt. 2.62 gills to the decimal of a hogshead.

LESSON CXI.

GEOMETRICAL PROGRESSION.

1. The first term of a geometrical progression is 9, the ratio 4. What is the 5th term?
2. If a boy made 10 cents the first day he sold papers, and twice that sum the second day, and so on, what amount did he make the tenth day?

RULE.—To find the distance from an upper corner to a lower opposite corner, extract the square root of the sum of the squares of the three dimensions, length, breadth, and height.

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3. Two houses are each 39 ft. long 32 ft. high, and 52 ft. apart. What is the distance from the lower corner of one to the opposite upper corner of the other?
4. What would be the cost of a draft at Denver, Col., on New York, for $4384.80, at 1¼% premium?
5. What is the cash value of a bill of goods amounting to $4860, at 10% discount, and 6% off for cash?

LESSON CXII.

1. A market-woman bought 6 chickens, agreeing to give 1 cent for the first, 3 cents for the second, and so on in geometrical ratio. What did she pay for the 6th chicken?
2. A man bought ten bushels of wheat, agreeing to give 1 cent for the first bushel, 3 cents for the second, 9 cents for the third, and so on in geometrical ratio. What did he pay for the last bushel.
3. From a bin 10 ft. long, 7 ft. wide, and 5½ ft. high, which was ⅛ full of oats, 50 sacks were filled, each containing 2 bu. 3 pk. 2 qt. What quantity remained in the bin?
4. What sum payable in 8 mo. 12 da., if discounted at bank at 10%, will give $975.62½ as the net proceeds?
5. If a quantity of provisions will last a man and wife 18⅔ days, and the wife alone 40 days, how long would it last the man?

LESSON CXIII.

1. The first term of a geometrical progression is 4, the last term 1024, and the ratio 3. What is the sum of all the terms?
2. The first term of a geometrical series is 5, the last term 98415, and the ratio 3. What is the sum of the series?
3. A and B gained in speculation $6300, which they divided in the ratio of ⅔ to ⅓. What was each one's share of the gain?
4. How many yards of carpeting ¾ of a yd. wide will it take to cover a floor 20½ ft. long and 18½ ft. wide, and what will it cost at $1.75 per yard?
5. What will be the cost, at 24 cents a cubic foot, of a stick of timber that is 14⅔ inches square and 18 feet long?

LESSON CXIV.

1. *A man bought* a house by making semi-annual payments in *geometrical* progression for 3 years. The first payment

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was $5, and the second $15. What did he pay for his house?

2. A father, when his son was 12 years old, put in the bank for him $100, to be trebled every 3 years until he was of age. What was the amount deposited?

3. For what sum must a note be drawn so that, discounted at bank for 6 mo. and 15 da. at 8%, the proceeds may be $1644.32?

4. $\frac{7.4+2.1+1.016}{.86-.01}=?$

5. If $600 placed at interest amount to $660 in 1 yr. 3 mo., what sum must be placed at interest at the same rate to amount to $1350 in one year?

ANNUITIES.

The Present Worth of an annuity is such a sum of money as will, in the given time, and at the given rate per cent, amount to the final value.

All problems in annuities of simple interest may be solved by combining the rules in Arithmetical Progression with those in Simple Interest. When at compound interest, by combining the rules in Geometrical Progression with those in Compound Interest.

LESSON CXV.

1. Find the present value of a perpetuity of $960 a year, to commence in ten years, interest 7%.

2. Ground rents on perpetual lease, give an income of $4683.48. What is the present value of the estate, allowing 7% interest?

3. Find the present value of a perpetuity of $1200 a year, payable quarterly, to commence in 6 yr. 10 mo. 18 da., interest 5%?

4. Divide 17661 into three parts which shall be to each other as $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$.

5. A owed $2400 due March 14; he paid $800 before and the remainder after it was due. When were the payments made, if they were 48 days apart?

LESSON CXVI.

1. Find the present value of an annuity of $980, to commence in 2 years, and to run 12 years 9 months, at 6%.

2. A man pays $15 a year for periodicals; if invested at 8% what will his subscriptions have amounted to in 30 years?

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3. How much must be paid yearly to secure $20000 at the end of 15 years, interest 6%?
4. A's gain is $1600, B's $1800, and C's $2400; A's capital was in 8 mo., B's 1 yr., and C's 1 yr. 3 mo.; the capital was $23460. How much did each own?
5. In a certain town $14193 are to be raised to build a court-house; it is estimated that 5% of the amount levied will not be collected, and 4% is allowed for collecting. What amount must be levied?

LESSON CXVII.

1. A man heard of an annuity of $960 that was left to him by an uncle 10 years previous. What was then his due, simple interest on the sums in arrears at 6%?
2. What is the present worth of an annuity of $1570 for 20 years, at 6%?
3. What will be the amount of an annual rent of $200 in 9 years, at 6%?
4. How many shares of Illinois Central stock, at 107¾%, brokerage ¼%, can be purchased for $2700?
5. A bin 12 ft. long, 6 ft. wide and 3 ft. deep is full of wheat. What is the value of the wheat at $1.75 per bushel?

LESSON CXVIII.

1. What is the present worth of an annuity of $79.62½, at 5%, to commence in 4 years and to continue 6 years?
2. What is the present worth of an annuity of $400 for 12 years, in reversion 6 years, at compound interest at 6%?
3. A man bought a house for $9600, which was to be paid in yearly installments of $1200. How much money at 6%, compound interest, would discharge the debt at the time of the payment?
4. Bought merchandise amounting to $4500 on 6 months credit; I paid $900 on account in 2 months; 2 months afterward $1200 on account, at the same time giving my note for the balance. For what time was the note drawn?
5. My broker sells for me $25000 worth of stock at 127%. What should I receive, the brokerage being ¼%?

MENSURATION.

Surfaces are triangular, circular, quadrilateral, parallelo*gram, rectangle,* trapezoid, rhombus, rhomboid, spherical, con*ical, cylindrical,* and pyramidal.

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Solids are rectangular, spherical, conical, cylindrical, and pyramidal.

RULES.

1. To find the area of a triangle, Multiply the base by half the altitude.

2. To find the area of any rectangular surface, Multiply the length by the breadth.

3. To find the area of a rhombus or a rhomboid, Multiply the length by the perpendicular distance between the two opposite sides.

4. To find the area of a trapezoid, Multiply one half the sum of the parallel sides by the altitude.

5. To find the area of a circle, Multiply the square of the diameter by .7854; or, Multiply the square of the circumference by .07958; or, Multiply the circumference by the diameter, and divide the product by 4.

6. To find the area of a sphere, Multiply the diameter by the circumference, or, Multiply the square of the diameter by 3.1416.

7. To find the area of a cone or pyramid, Multiply the circumference of the base by ½ the slant height.

8. To find the area of a prism or a cylinder for convex surface, Multiply the circumference by the altitude.

Find the area of the base, if triangular, by Rule 1; if rectangular, by Rule 2; if circular, by Rule 5.

9. To find the area of a cube, Multiply the length by the breadth, and that product by 6.

10. To find the slant height of a cone, when the diameter of the base and the altitude are given, Extract the square root of the sum of the squares of the altitude and one-half the diameter, and the result will be the slant height.

11. To find the circumference of a circle, Multiply the diameter by 3.1416.

12. To find the diameter of a circle, Divide the circumference by 3.1416, or multiply by .3183.

13. To find the diameter of a circle when the area is given, Divide the area by .7854 and extract the square root.

14. To find the circumference when the area is given, Divide the area by .07958 and extract the square root.

3.1416= ratio of circumference to diameter.
.3183= ratio of diameter to circumference.
.7854= ratio of a circle to a square.
.5236= ratio of a sphere to a cube.
.07958= *ratio* of area of a circle to square of circumference.

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15. A cone is one-third of a cylinder of the same base and the same altitude.
16. A pyramid is one-third of a prism of the same base and the same altitude.

LESSON CXIX.

1. Find the area of a trapezoid, whose parallel sides are 174 feet and 148 feet, and whose altitude is 67 feet.
2. The area of a circular field is $2\frac{1}{2}$ square miles. How many acres does it contain?
3. The area of a circular lot is 153.9384 square rods. What is its diameter?
4. The report of a rifle was heard 15 seconds after the flash was seen. How far off was the rifle, sound moving at the rate of 1142 ft. in a second?
5. A and B can build a wall in 10 days; A can build it in 14 days. How long will it take B to build it alone?

LESSON CXX.

1. Find the side of a square, inscribed in a circle whose diameter is 8 rods.
2. A cow is fastened to one end of a rope 54 feet long, the other end of which is fastened to the top of a post 4 feet high. Find the area of the greatest circle upon which she can graze.
3. Find the convex surface of a cylinder whose altitude is 2 ft. 6 in., and the circumference of its base 5 ft. 2 in.
4. 3888 cubic feet of earth were removed in digging a ditch, the length of which was 16 times the width, and the width 3 times the depth. How long was the ditch?
5. What is the value of a pile of wood 14 ft. long, 6 ft. wide, and $6\frac{3}{4}$ ft. high, at 75 cents per cord foot?

LESSON CXXI.

1. Find the convex surface of a cone whose diameter is 18 ft. 4 in., and the slant height 30 ft.
2. Find the surface of a sphere whose diameter is 10 inches.
3. Find the diameter of a circular island, which contains $2\frac{1}{2}$ square miles?
4. A pile of wood whose height is $\frac{1}{2}$ its width, and $\frac{1}{8}$ its length, cost $624, at the rate of $6.50 per cord. What were the dimensions of the pile?
5. *What will* be the cost, in currency, of a sight draft on *London for £648 12s.*, when exchange is $4.87½ for a pound *sterling*, and gold is quoted at 106½?

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LESSON CXXII.

1. The circumference of a circle is 144 yards. Find the side of the inscribed square.
2. The area of a circle is 42767.33 square feet. What is the diameter and what is the circumference?
3. If an iron plate, 6 ft. high and 4 ft. wide, revolve around a rod passing perpendicularly through its center, what is the entire surface of the cylinder described by it?
4. A house valued at $6500 is insured for $\frac{3}{4}$ its value, at $\frac{1}{2}\%$. What is the premium?
5. A grocer purchased goods as follows: June 1, 1882, $600 on 3 mo. credit: July 15, 1882, $450 on 2 mo. credit; and Aug. 1, 1882, $800 on 4 mo. credit. What was the average time of payment?

LESSON CXXIII.

1. Find the entire surface of a square pyramid, whose base is 12 ft. 6 in. square, and its slant height 36 feet.
2. What is the surface of a globe 4 ft. in diameter?
3. Find the volume of a cylinder whose altitude is 8 ft. 6 in., and the diameter of whose base is 4 ft.
4. A cistern has a receiving and a discharging pipe; if both are open it takes 10 hours to fill it; if the latter is closed it takes 8 hours to fill it. If the former is closed, how long will it take the latter to empty the cistern?
5. What will it cost to sod a yard $26\frac{2}{3}$ feet long and $24\frac{3}{4}$ feet wide, at 75 cents a square yard?

LESSON CXXIV.

1. Required the volume of a square pyramid whose base is 5 feet on each edge, and whose altitude is $10\frac{1}{2}$ feet.
2. Required the volume of a cone, the diameter of whose base is 6 feet, and whose altitude is 12 feet.
3. Find the cost of a piece of timber 18 inches square at the ends, and 36 feet long, at 25 cents a cubic foot.
4. What are the dimensions of a piece of land the width of which is $\frac{3}{4}$ its length, and which contains 300 square rods?
5. The interest of $1816, at 7%, was $158.90. What was the time?

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LESSON CXXV.

1. Find the volume of a sphere whose diameter is 3 feet.
2. The altitude is 5 ft. 6 in. and the diameter of the base is 2 feet. Required the volume of the cylinder.
3. Find the volume of a pyramid 10 ft. square at the base, and 16 ft. high.
4. At a cost of $8\frac{1}{2}$ per cwt. what per cent would be made upon 2 barrels of sugar, each weighing 2 cwt. 20 lb., if sold at $10\frac{1}{2}$ cents a pound?
5. On account of the failure of the cotton crop, cotton goods which were selling at a profit of 25% were remarked 5% higher. At what per cent profit were they then offered for sale?

LESSON CXXVI.

1. How many acres in a semi-circular farm whose radius is 150 rods?
2. Find the volume of a cone 10 feet high and with 5 ft. diameter of base.
   Find the volume of a sphere 16 inches in diameter.
3. What is the cost of a hewn log, 2 ft. square at the ends and 28 ft. long, at $.30 per cu. ft.?
4. A man invested $1500 in quinine at $1.50 a dram, avoirdupois, and sold it at $2 a dram, apothecaries weight. Did he gain or lose, and how much?
5. How many sq. feet of lumber will be required to make a picket fence around a lot 22 rods long, and 18 rods wide, each side to begin and end with a picket; the height of the fence to be 5 feet and the width of the pickets to be 4 inches, and a space of 4 in. between them?

LESSON CXXVII.

1. A house 40 ft. long and 30 feet wide had a pyramidal roof 12 ft. high. Find the length of a rafter reaching from one corner of the building to the highest point in the roof.
2. Find the value of a farm at $65 per acre, its form being a quadrilateral, with two opposite sides parallel, one 42 chains long, the other 58 chains long, and the perpendicular distance between them 25 chains?
3. *How much* longer is the side of a square circumscribing a *circle 30* rods in diameter, than one inscribed in the same *circle?*

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4. What is the duty at 20% on 80 chests of tea, the net weight of each being 100 pounds, and the tea costing 75 cents per pound?
5. A and B entered into partnership; A put in $4500 and took out $\frac{1}{3}$ of the gain. How much did B put in?

LESSON CXXVIII.

1. Find the value of a log 20 ft. long and 7.854 ft. in circumference, at 40 cents a cubic foot.
2. Find the cost of a triangular pyramid of marble, the altitude being 12 ft. and each side of the base 4 ft., at $2.50 per cu. ft.
3. Find the volume of a globe whose diameter is 45 inches.
4. Bought 30 French mirrors for $1200; paid in duties $41.34; for freight $81.56; for cartage $12.10; and for insurance $105. If I sell them at $72 apiece what will be my gain per cent?
5. A certain town has property valued at $64530; it must raise a tax of $2259.90 to build a school-house, and to defray other expenses; there are 540 polls, taxed 60 cents each. What is the tax on a dollar, and what is A's tax, whose property is valued at $2214, and who pays for 2 polls?

LESSON CXXIX.

1. How many bushels in a conical heap of grain, the base of which is 9 ft. in diameter, and the altitude 5 feet?
2. Find the volume and entire surface of a pyramid, whose base is a rectangle, 30 feet by 40 feet, and the edges which meet at the apex are 70 feet.
3. Find the side of the inscribed square of a circle whose area is 766.86 square inches.
4. What will be received on a note of $1000, due in 90 days, if discounted at bank at 7%?
5. An orchard contains 3136 trees, planted at equal distances apart, and in the form of a square. How many rows are there?

LESSON CXXX.

1. Find the distance from one of the lower corners of a room 40 ft. long, 30 ft. wide and 12 ft. high, to the opposite *upper corner.*

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2. Required the value, at $60 per acre, of a piece of land 60 rods long, 40 rods wide at one end and 30 rods wide at the other end.
3. Find the volume of a sphere whose diameter is 6 ft. Find the area of the same sphere.
4. Four sacks of coffee, each containing 30 pounds, were sold at 12½% below the retail price, and 3% off for cash; the retail price was 30% above cost; the amount received was $40.74. What was the retail price per pound?
5. What are the liabilities and assets of a bankrupt firm, when a creditor received $4800 on $40000, his claim being ⅛ of the entire liabilities?

LESSON CXXXI.

1. Find the distance from one of the lower corners of an assembly room, 92 ft. long, 69 ft. wide and 20 ft. high, to the opposite upper corner.
2. Required the value, at $50 per acre, of a piece of land 50 rods long, 35 rods wide at one end and 25 rods wide at the other end.
3. Find the distance from one of the lower corners of a room 40 ft. square and 20 ft. high, to the opposite upper corner.
4. At what per cent will $150 yield $56.25 in 6 yr. 3 mo.?
5. If one cord of wood cost $5½, what will be the cost of 6 loads of ⅞ of a cord each, 8 loads of ¾ of a cord each, and 8 loads of ⅔ of a cord each?

LESSON CXXXII.

1. Find the number of gallons of oil that can be put into a can whose altitude is 35 inches, and the radius of whose base is 10 inches.
2. Find the number of square inches of tin in the can whose dimensions are given in example above.
3. A log 24 ft. long and 18 in. in diameter was sawed square. How many cubic feet were cut away?
4. For what amount must a note be drawn for 30 days in order to obtain $500 at bank, discount being 7%?
5. What is the difference between the true and bank discount of $1438, for 90 days, without grace, at 12%?

LESSON CXXXIII.

1. A pyramid is 18 feet square at the base and 40 feet high. *Find the convex surface and the solid contents.*

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2. From the outside of a globe 16 inches in diameter, 1 inch in thickness was cut off. How many cubic inches were cut away?
3. The longer sides of a rhomboid measure 70 rods, the shorter sides 20 rods, and a perpendicular from the obtuse angle at the extremity of one of the longer sides, meets the opposite side 12 feet from the acute angle at its extremity. Required the area.
4. A merchant sold cloth for $4.27\frac{1}{2}$ per yard, that was marked $4.75. What per cent did he discount?
5. If the difference in time between two places is 1 hr. 45 min., what is the difference in longitude?

LESSON CXXXIV.

1. Required the solid contents of a sphere 9 feet in diameter.
2. Required the solid contents of the largest cube that could be cut out of the above sphere.
3. Required the solid contents of a cube out of which the above sphere was cut.
4. A merchant bought $384.75 worth of hardware, kept it on hand 6 months when money was worth 8%, and then sold it at a net gain of 6%. For how much was it sold?
5. How many cubes whose edge measure is $\frac{1}{4}$ of a foot, are equivalent to a block 6 feet long, 4 feet wide and 3 feet high?

LESSON CXXXV.

1. The boundary lines of a meadow are as follows: The first runs north 38 rods, the second northeast 30 rods, the third south 56 rods, and the fourth west 24 rods to the place of beginning. Find the area of the meadow.
2. The longer sides of a piece of land in the form of a rhomboid, run north and south, are 30 rods apart, and the shorter sides are $\frac{1}{3}$ the length of the longer; if a piece of land in a rectangular form was inclosed by lines of the same length as these respectively, it would contain 14 A. 72 P. What is the area of the rhomboid?
3. Out of a cone 20 feet high and 8 feet in diameter, a pyramid was cut, having its base square. Required the volume of the pyramid.
4. How many perches of stone will be required to build a cellar wall 16 ft. long, 12 ft. wide, 6 ft. high, and $1\frac{1}{2}$ feet thick; and what will be the cost of the cellar if excavat-

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ing is $4.50 a cubic yard, and stone and masonry $3.75 a perch?

5. The diameter of two spheres are respectively 6 and 12 inches. How many spheres of the smaller size could be made from the larger?

PROMISCUOUS EXAMPLES.

1. What are the bank discount and proceeds of $1000, payable in 1 year 8 months, with interest at 6% discounted at bank at 10%?
2. When United States 6's are quoted at 110¾, what will $2480 in bonds cost?
3. When gold is at 112½, what will be the interest in currency on $6245 in United States 5's extended?
4. What must be the length of a bin 6 feet wide and 4 feet deep to contain 162 bushels?
5. A man paid $330 for a horse, cow and calf; for the cow he gave 8 times, and for the horse 24 times as much as he paid for the calf. What was the cost of each?
6. What is the present worth of $4000, payable in 4 years 2 months, discounting at 6%?
7. When gold is at 120, what will be the semi-annual interest, in gold, on a note for $12000, bearing 8% interest?
8. If ½ of a yard of cloth ⅞ of a yd. wide cost $⅝, what is the value of ¾ of a yd. of the same quality 1¼ yards wide?
9. A and B form a partnership for 2 years; A puts in $12000 and B $4800. How much must B add to his capital, at the close of the first year, to have an equal division of profits?
10. If 12 horses consume 63 bushels of grain in 24 days, how many bushels will supply 72 horses 16 days?
11. What will be the cost of paving and curbing a street ¾ of a mile long and 35 ft. wide, the paving to be $1½ per sq. yd., the curbing 75 cents per lineal foot, the width of the curbing is to be 8 inches, and to be taken from the width of the street?
12. The five-cent nickle piece is 20 millimeters in diameter. How many, placed side by side, will be required to reach 17 hektometers?
13. A grocer sold at an average of 20 cents a pound, 10 pounds of coffee worth 28 cents a pound, 6 pounds of tea worth 56 cents a pound, and 16 pounds of sugar worth 8½ cents *a pound.* Did he gain or lose, and how much?

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14. A merchant bought goods to the amount of $623.10, on 60 days' credit, and $727.20 on 90 days' credit; he paid them both in 30 days, the former with 3% discount, and the latter 5% discount. Money being worth 6% what did he gain?

15. A horse and carriage were left at a stable 120 days, subject to the following conditions: the keeper to pay $2 a day and board the horse when he used them, and $.75 a day to be paid by the owner, when not used, together with shoeing. The owner received at the end of the time $120, ten dollars having been deducted for repairs and shoeing. How many days were they used?

16. March 20, 1877, a man took out a policy on his house, valued at $7600, for $\frac{4}{5}$ its value at $1\frac{1}{4}\%$; he carried the policy 7 years and 6 months, when the house was burned. What was his loss, no account being taken of interest on premiums?

17. If 160 yards of carpeting $\frac{5}{8}$ of a yard wide, in being cleaned will shrink 4 inches in length and 5 inches in width to the sq. yd., how many square yards will it then cover?

18. Mr. R authorized an agent to sell some real estate, and to invest the net proceeds in wool, at 40 cents a pound. If the rate of commission for selling was 2%, and for buying 3%, and he bought 37500 pounds of wool, for what amount was the real estate sold?

19. A triangular park has 2 equal sides, and the third is $\frac{4}{5}$ the length of one of the others; the distance around the park is 330 rods. What is the distance from the center of the shortest side, to the point where the other two sides meet?

20. Divide $1813 among A, B and C, so that B's share will be $\frac{1}{3}$ greater than A's, and C's share $\frac{1}{3}$ greater than B's. What will be the share of each?

21. If the last term is 190, the first term 10, and the number of terms 21, what is the common difference?

22. In an orchard 7 Hm. long and 24.2 Dm. wide, the trees stand in regular rows at a distance of 6 m. apart, and the outer rows are 8 m. from the boundary line. How many trees in the orchard?

23. What will be the duty, in United States currency, on a case of velvets invoiced in Paris at 51850 francs, the rate of duty being 60% ad valorem?

24. What was the sum paid for a bill of goods amounting to $6480, at 10% discount, and $3\frac{1}{2}\%$ off for cash?

25. A tree 70 feet in height stands in the center of a lot 360

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feet deep, and 270 feet wide. What is the distance from the top of the tree to any corner of the lot?

26. For what sum must a note be drawn, payable in 4 months, the proceeds of which shall be $3600, discounted at bank at 7%?

27. The time past noon is $\frac{1}{5}$ of the time till midnight. What is the time?

28. In a certain town $14193 is to be raised to build a bridge; it is estimated that 5% of the amount levied will not be collected, and 4% is allowed for collecting. What amount must be levied?

29. A man traveled 12 days, traveling the first day 20 miles, and increasing the distance 4 miles each day. How many miles did he travel?

30. At what per cent will a given principal double itself in 10 years?

31. Wishing to purchase $6500 worth of real estate, how much shall I need to add to the proceeds of the following notes which I hold, if I indorse them May 14, 1882, and get them discounted at bank at 10%?

[1] A note for $2500 bearing 6% interest, dated March 30, 1882, and due 8 months after date.

[2] A note for $2000, bearing 7% interest, dated March 10, 1882, and due 6 months after date.

A note for $1500, bearing 8% interest, dated April 27, 1882, and due 9 months after date.

32. The extremes of a series are 4 and 124, and the common difference 6. What is the number of terms?

33. How many miles a day does a man travel who walks 1931.16 Hm. in 12 days.

34. What is the difference between the true and bank discount of $4070, payable in 90 days at 7%?

35. A gate 10 ft. wide and 6 ft. high, leading to a pasture, is situated midway between two trees, one of which is 70 ft. high, and the other only 40 feet high; the tops of the trees are 50 feet apart. Required the distance between the trees at their base, and the distance from each upper corner of the gate to the top of the tree nearest it.

36. A person was offered $\frac{1}{3}$ interest in an estate of $348000, or 1 dollar the first day, to be increased by 2 dollars each succeeding day for a year; he accepted the latter. Did he gain or lose, and how much?

37. *What will it cost to pave a street 8 Km. long and 16 m. wide, at 25 cents a square meter?*

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38. How many Mm. are there in 6 leagues?

39. In measuring a street it is ascertained that $\frac{11}{40}$ of it is paved, and 102 meters remain to be paved. What is the length of the street?

40. At $1.75 a bushel, what is the value of a bin of wheat whose dimensions are 12 feet by 8 feet, and 5 feet deep?

41. If 9 oranges and 8 lemons cost 69 cents and 12 oranges and 7 lemons cost 81 cents, what is the price of one of each?

42. A bill of exchange of £600, to remit to Liverpool, was purchased in New York for $3000. What was the rate of exchange?

43. The sum of $24000 is to be divided among A, B and C. The sum of A's and B's is to B's minus A's, as 7 to 1; and C's minus B's is to C's plus B's, as 1 to 9. What is the share of each?

44. If to a certain number you add $\frac{4}{5}$ of itself, the sum, minus 40, will equal $1\frac{1}{3}$ times the number. What is the number?

45. Albany, New York, is in 42° 39′ 50″ north latitude, and Mobile, Alabama, 30° 41′ 26″ north latitude. How many kilometers farther south is Mobile than Albany?

46. A vat that will hold 3564 gallons of water will hold how many bushels of grain?

47. If I buy stock at 20% discount, and every six months receive a dividend of $4\frac{1}{2}$%, what annual rate of interest do I receive?

48. How many meters of carpet will be required for a room 12 m. 6 dm. long, and 5m. 6 dm. 5 cm. wide, the carpeting being 8 dm. 2 cm. wide?

49. A starts on a journey at the rate of 5 miles an hour, and 8 hours afterward B starts after him at the rate of 7 miles an hour. How far will B travel before he overtakes A?

50. What is the time of day if $\frac{1}{3}$ the time past noon equal $\frac{1}{4}$ the time to midnight?

51. Two ships started from the same port, one sailing east, and the other south. One having sailed 180 miles and the other 135 miles, how many kilometers are they apart?

52. Find the side of the greatest square beam that can be hewn from a log 5 feet in diameter.

THE END.

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